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MARCH 1960

$1.00

# FOOD ENGINEERING

BETTER MANAGEMENT IN MANUFACTURING, PACKAGING, MARKETING

A McGRAW-HILL PUBLICATION

## MARKET RESEARCHERS POINT WAY TO PROFITS

*FE Survey p. 37*

WEIGHING REPORT p. 93

# "HIRE" THIS FOOD SPECIALIST...

## NO SALARY REQUIRED!

- Years of practical experience in solving food production problems!
- Can help with your vitamin enrichment and fortification procedures
- Offers unlimited supply of vanillin
- Know-how of years of leadership in color field

THIS FOOD SPECIALIST is a Sterwin Technically-Trained Representative . . . an expert with technical and practical experience to help you produce better food products more easily and economically.

He's cut time, expense, production steps in dozens of cases . . . is relied on by food manufacturers (large, medium, small) for prompt solutions to color, vitamin, vanillin and other food ingredient problems.

For a new production set-up, or to improve an existing one . . . see your local Sterwin Representative . . . costs you nothing . . . can save you plenty.

Sterwin Chemicals INC.

Subsidiary of Sterling Drug Inc

1450 Broadway, New York 18, N.Y.

FOOD ENGINEERING
FOR MANAGEMENT

MARCH 1960

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Accurate testing can make the difference between Grade A and Grade B profits. Make sure you're grading *UP* with the Bausch & Lomb Abbe-3L Refractometer. With the Abbe-3L, you're *sure* you're meeting purity and concentration specifications. It's industry's grading standard.

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**FOOD ENGINEERING** (Formerly Food Industries) **March, 1960, Vol. 32, No. 3.**

Published monthly by the McGraw-Hill Publishing Co., Inc., James H. McGraw (1860-1948), Founder. Office of publication, 99-129 N. Broadway, Albany 1, N. Y. See panel below for directions regarding subscriptions or change of address.

**Executive, Editorial, Circulation and Advertising Offices, McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y.**

**Officers of the Publications Division:** Nelson L. Bond, President; Shelton Fisher, Wallace F. Traendly, Senior Vice-Presidents; John R. Callaham, Vice-President & Editorial Director; Joseph H. Allen, Vice-President & Director of Advertising Sales; A. R. Venezian, Vice-President & Circulation Coordinator.

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Subscriptions are solicited only from men with management responsibility in manufacturing, marketing, packaging, engineering, and technology in companies engaged in food manufacturing. **Position and company connection must be indicated on subscription orders. Send to address shown in box below.** Rates: U.S. Possessions and Canada for individuals in field of publication, $2.00 per year, single copies $1; all other foreign $25.00 per year.

Second-class postage paid at Albany, N. Y. Printed in U.S.A. Title registered in U.S. Patent Office. ©Copyrighted 1960 by McGraw-Hill Publishing Co., Inc., all rights reserved.

SUBSCRIBERS: Send subscription correspondence and change of address to Fulfillment Manager, Food Engineering, 330 W. 42nd St., New York 36, N. Y. Subscribers should notify Fulfillment Manager promptly of any change of address, giving old as well as new address, and **including postal zone,** if any (Official Post Office Request). If possible, enclose an address label from a recent issue of the magazine. Since copies are addressed one to two issues in advance please allow one month for change to become effective.

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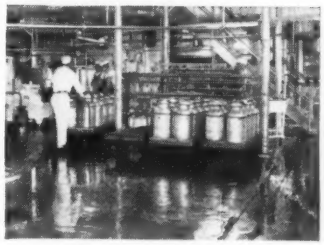
*Resists corrosive effects of blood, water soaking, animal fats and brine. Monile applied in the beef kill room, smokehouse alley, sausage kitchen and lard room.— Peet Packing Co.*

# How MONILE FLOORS increase sanitation...cut costs

MONILE—one-piece monolithic surfacing—stops leakage of processing residue... Prevents harboring of bacteria in open joints...Resists water and grease soaking ...Withstands destructive effects of food acids, alkalies, salts, sugar, brine and strong cleansers...Stands up under heavy steel-wheel trucking, loading and impact. MONILE floors save repair, replacement or resurfacing. Bonds strongly. Applied to existing surfaces—concrete, tile, wood. Saves down-time and processing stoppage. MONILE is a product of The Master Mechanics Co.—specialists in solving problems of sanitation and maintenance for nearly a half-century. Send for illustrated brochure. *The Master Mechanics Co., 2097 Columbus Rd., Cleveland 13, Ohio. The Master Mechanics Chemicals Co., (Canada) Ltd., Toronto, Ontario.*



*Lactic acid resistant Monile checked erosion, spalling and cracking of floors at Orrville Milk Condensing Company.*

*Leakage of processing residue from the eviscerating room to packaging area below was stopped with Monile at American Poultry Company.*

*Serving the Food Industry since 1913*

MASTER MECHANICS

*Heavy trucking of raw materials on sharp skids is resisted by Monile. Flour easily cleaned from Monile with dry mop—Wonder Bread Bakery.*

# Up to 7% MORE CORN off the Cob!

## —with FMC "Automatic Size Detection" Corn Cutters

Production comparisons over the past two seasons, covering thousands of hours on hundreds of FMC Model 3-A Corn Cutters, have produced these vital customer estimates*:

**Up to 7% more yield per ear!**
**Up to 20% more output per cutter!**
**Up to 50% more cutting between honings!**
**Up to 21% fewer parts, lower maintenance!**

Big improvements in both yield and quality are maintained even where machines average 120 or more ears per minute! One big reason: exclusive FMC "Automatic Size Detection," where pre-opening knives and gauging fingers allow you to cut mixed ear sizes to any desired depth without size grading or constant machine adjustment. Descriptive Bulletin No. 601-E gives full information. Write for free copy, or ask your FMC representative to call.

*Depending on make and model of corn cutters replaced.

*Putting Ideas to Work*

FOOD MACHINERY AND CHEMICAL CORPORATION
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# TRENDS & FORECASTS

SPECIAL

FOOD ENGINEERING

SERVICE to EXECUTIVES

**Number of food and kindred products factories increased 4.5%** between '54 and '58, according to Census of Manufactures. Number of employees gained slightly to 1.69 million, but value added by manufacture jumped 19.7% to 17.1 billion. Plants with more than 20 employees number 14,260.

**Retail food sales will rise to $90 billion by 1970, compared to $52 billion** last year, Food Fair predicts. Number of supermarkets is expected to increase by one-third to 40,000.

**More U. S. food companies plan to take advantage of Mexico's abundant** crops by putting processing plants in that country. Among them are Campbell Soup, General Mills, and California Packing. One million lb. of vegetable oil products are now produced annually in Mexico by Anderson, Clayton.

**Increased export of soybeans and their products is expected** to result from market development contract made by USDA and Soybean Council. More than 40 countries will be involved.

**Continued shifts in eating habits will boost per capita consumption** of fruits and vegetables about 10% by '70, USDA predicts. Consumption of meats, fish, and poultry is expected to increase 15%. Declines of 5% are foreseen for cereals and potatoes.

**One of five consumers regularly purchases American-Oriental foods** today, as against one out of fifteen 12 yr. ago, Chun King estimates. Sales now approximate $30 million. Frozen items account for 33% of Chun King sales and are growing rapidly.

**More than 4 billion packages of prepared frozen food annually** will be produced by '69, up 300%, predicts J. B. Fowler, Jr., Seabrook Farms.

**Canned sweet corn pack for '59 jumped 25.2% to 40 million** actual cases, NCA reports. Total canners supply of canned corn for '59-'60 season is 56 million cases, up 11½%.

**Overall pack of canned vegetables was down 8% last year and 14% under** '56 record. Carryover is estimated at 3% less than last season.

**Production of fish portions increased 70% in '59 to 37 million lb.,** according to Bureau Fisheries. But fish sticks dropped 1% to 60.3 million lb.

**Consumption of coffee increased 7.8% in '59 to 2.4 billion lb. roasted.** Amount used for soluble coffee amounted to 17.5%, for a 6% poundage gain, according to Pan American Coffee Bureau.

**Per capita consumption of frozen desserts hit record 21.4 qt.** for total of 943.5 million gal. last year. Ice cream increased 6.7%, ice milk 6.75%, sherbet 7.36%, water ices 12.37%, and Mellorine 9.8%, International Assn. of Ice Cream Mfgrs. reports.

See Developments to Watch p. 13

**Production of cottage cheese curd increased 3% in '59 to 567 million lb.** Creamed cottage cheese gained 6% to 748 million lb., USDA reports.

**Almost 10% of Florida orange crop now goes into chilled juice,** and consumption is still increasing, Florida Canners Assn. says.

**Winter vegetable production is forecast 4% above '59 by USDA.** Greatest increases are expected for cabbage, carrots, and lettuce. Tomatoes, celery, and sweet corn are off considerably.

# What's the hidden magic that makes her buy your brand again...and again?

There are many ways to sell a product once . . . but repeat sales depend on the hidden magic of flavor, performance, texture, economy . . . customer satisfaction with your product.

Fast-growing way to achieve these sales assets is with the improvement added by enzymes. And today Miles Chemical is your best source for enzymes. Takamine products offer the widest variety of enzymes available . . . all highly specific in their actions . . . derived from fungal, bacterial, plant, or animal sources . . . and readily inactivated when their job is done.

Beverage or food product . . . Takamine enzymes can consistently help speed up processing, guard color and stability, enhance flavor, protect shelf life . . . endow your products with the hidden magic that captures repeat customers. Let us tell you more about these willing workers from Takamine. All inquiries are handled promptly.

**TODAY'S WIDEST VARIETY OF ENZYMES**

**Amylases** for any degree or kind of starch conversion in baked goods, beer, cereals, chocolate, confectionery, flavors, fruit juices, syrups, and vegetables.

**Proteases** for limited, selective or drastic proteolysis of most proteins in baked goods, beer, cereals, chocolate, meat and fish, and protein hydrolysates.

**Glucose Oxidase** for removing glucose or oxygen in beer, carbonated beverages, milk, eggs, flavors and juices.

**Catalase** to decompose hydrogen peroxide in cheese and egg processing.

**Pectinase** to increase yields, improve color, and speed processing in fruit juices and wine production.

**Another Takamine food enhancer** is sodium erythorbate (sodium isoascorbate) or erythorbic acid, economical antioxidants widely used to improve flavor, appearance and shelf life of many food products.

**It will TASTE better, LOOK better, SELL better with Takamine products.**

**TAKAMINE®** (pronounce it Tack-a-ME-nee)

## Miles Chemical Company

DIVISION OF MILES LABORATORIES, INC., ELKHART, INDIANA

General Sales Office: Elkhart, Indiana, Telephone COngress 4-3111; Clifton, New Jersey, Telephone PRescott 9-4776; New York, N.Y., Telephone MUrray Hill 2-7970.

Ad No. 5-60

## Schedule of Events

**March**

18-19—Refrigeration Research Foundation, Scientific Advisory Council Symposium; LaSalle Hotel, Chicago.
21-24—Institution Food & Supply Show; Trade Show Building, N.Y.C.
22-23—Folding Paper Box Assn. of America, convention and competition; Ambassador Hotel, Los Angeles.
24-26—Food Additives Conference; Kellogg Center, Michigan State U., East Lansing.

**April**

4- 8—American Management Assn., National Packaging Exposition; Convention Hall, Atlantic City.
19-21—Research & Development Associates, Quartermaster Food & Container Inst., convention; Congress Hotel, Chicago.
21-22—American Dry Milk Inst., convention; Edgewater Beach Hotel, Chicago.
25-28—National Assn. of Refrigerated Warehouses, convention; Americana Hotel, Bal Harbour, Fla.

## HORS D'OEUVRES

**▶ We should pay Cuba the going world price of 3 cents a pound for sugar, not our subsidizing 5 cents. We don't give two cents for Communism.**

▶ If any of the missile fuel aboard the "SS Angelo Petri" got mixed with the wine during the near disaster, we'll soon have some space men in orbit.

**▶ Frequent nibbling at food, the way chickens do, is said to be better for the heart than 3 squares. But think of your employer's heart!**

▶ The 250 million pounds of gum chewed a year by Americans would encircle the earth 60 times if formed into one stick. And it could be stretched to Mars.

**▶ Reason a young convict gave for escaping prison: "I just couldn't stand it there. When I escaped I got my first coke and candy bar in 19 months." Intolerable cruelty, without a doubt.**

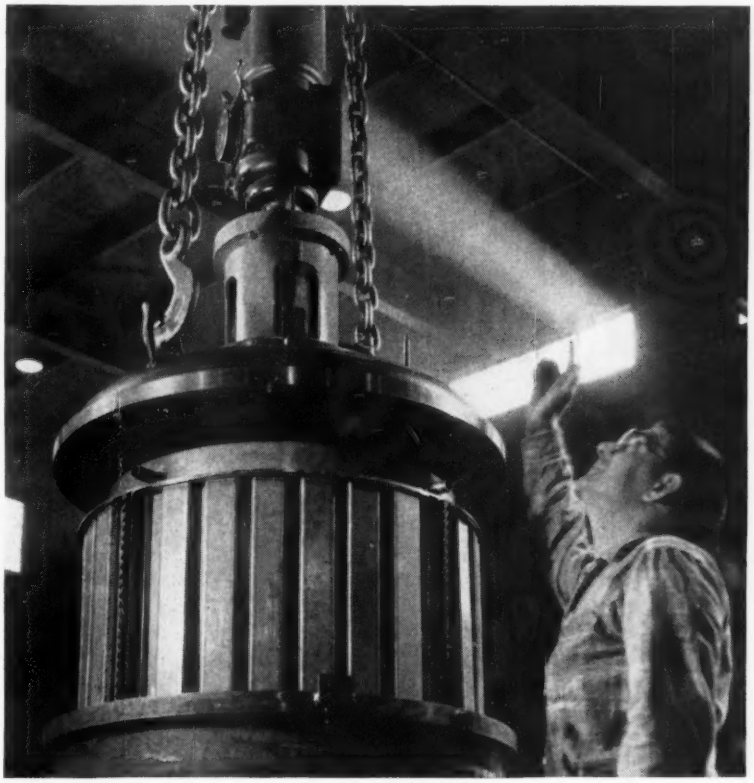
▶ Says an eye specialist, "There's no evidence to show that excessive TV viewing does more than injure the mind." Food commercials included?

**▶ Says one food packer: "Buyers have eyes of marble and a soul to match." Famous last words.**

▶ Widespread activity among states to pass humane slaughter legislation is expected this year with strong public support. People demand meat but are annoyed at packers for supplying it.

**▶ April 3-9 is National Library Week "for a better informed America . . . We better be better informed, lest our prestige, power, and liberty be deformed."**


# FLUIDICS* AT WORK



## How to evaporate "problem" products more efficiently

If you evaporate products that are (1) heat sensitive, or (2) highly viscous, or (3) low in thermal conductivity, take a look at the Pfaudler Wiped Film Evaporator.

What makes it so well suited to handling difficult evaporations is the *mechanically wiped evaporating surface.*

It works like this: Centrifugal force of an internal rotor (you can see it in the picture above) holds four free-floating wipers in contact with the evaporator wall.

**Thin uniform film.** These wipers spread your product over the entire evaporating surface in a *thin, uniform film.* Slots in each wiper prevent product "curl" forward of the wipers and accelerate product movement down and *off* the wall.

**Efficient heat transfer.** Since the heated wall is kept completely wet, you are sure of maximum heat transfer—from every square foot of surface—very important for high capacity with viscous and heat-sensitive materials, or those with low thermal conductivity.

**Test program.** In our Test Center we keep available a four-square-foot Wiped Film Evaporator for making evaluations.

When it comes to production units, you can select from units offering 4 to 100 square feet of evaporating area, or larger units by custom design. (That's a 50-square-foot one being assembled in the picture.)

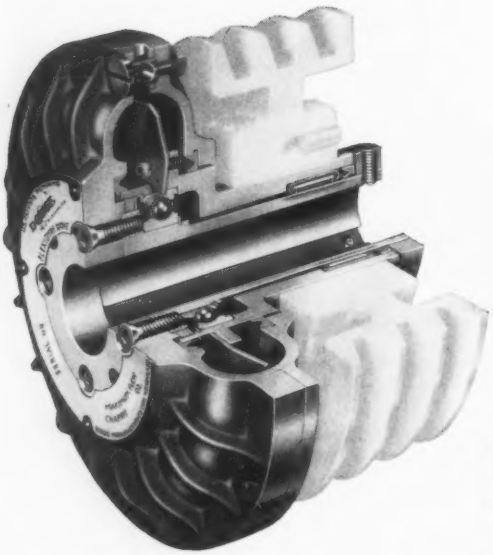
For more information about testing your product, or a detailed specification sheet, write to our Pfaudler Division, Dept. FE-30, Rochester 3, N. Y. Thank you.

*FLUIDICS is the Pfaudler Permutit program that integrates knowledge, equipment and experience in solving problems involving fluids.

**PFAUDLER PERMUTIT INC.**
Specialists in FLUIDICS . . . the science of fluid processes

# WHAT'S YOUR PROBLEM?...

- ☑ Overheated motors?
- ☑ Excessive belt maintenance?
- ☑ Breakage of materials being processed —like thread, wire, paper?
- ☑ Expense of oversize or high torque motors?
- ☑ High demand rate?
- ☑ Expense of reduced voltage starters?
- ☑ Clutch trouble?
- ☑ Breakage of transmission parts due to instantaneous shock loads?
- ☑ Damage and recurring down-time from overloads?



# FLEXIDYNE

## THE DRY FLUID DRIVE

It is no longer necessary to accept the destructiveness—the costliness—of conventional starting in the mechanical transmission of power. Flexidyne changes that!

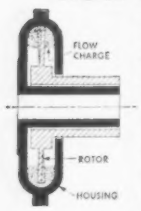
Flexidyne is the new way to start loads *smoothly*—to protect against shock and overload—to save power—all *without any sacrifice of efficiency at full load!*

This revolutionary development is ushering in "the day of the soft start"—which can mean thousands of dollars to you in equipment savings and in better, more economical operation.

Flexidyne is available, off the shelf, in Drives and Couplings. Capacities range from fractional to 1,000 hp. Ask your local Dodge Distributor or write us for technical bulletin.

DODGE MANUFACTURING CORPORATION, 2800 Union St., Mishawaka, Ind.

### HOW FLEXIDYNE WORKS




The "dry fluid" in Flexidyne is tiny heat-treated steel shot. A measured amount, called the "flow charge," is contained in the housing, which is keyed to the motor shaft. Inside the housing is a rotor, free to revolve relative to the housing, but connected to the load.

When the motor is started, centrifugal force throws the flow charge to the perimeter of the housing, packing it between the housing and the rotor, which transmits power to the load. Initial slippage is momentary. Housing and rotor become locked together and achieve full load speed without slip and at 100% efficiency.

**CALL THE TRANSMISSIONEER** — your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the *white* pages of your telephone directory for "Dodge Transmissioneer."

**DODGE**

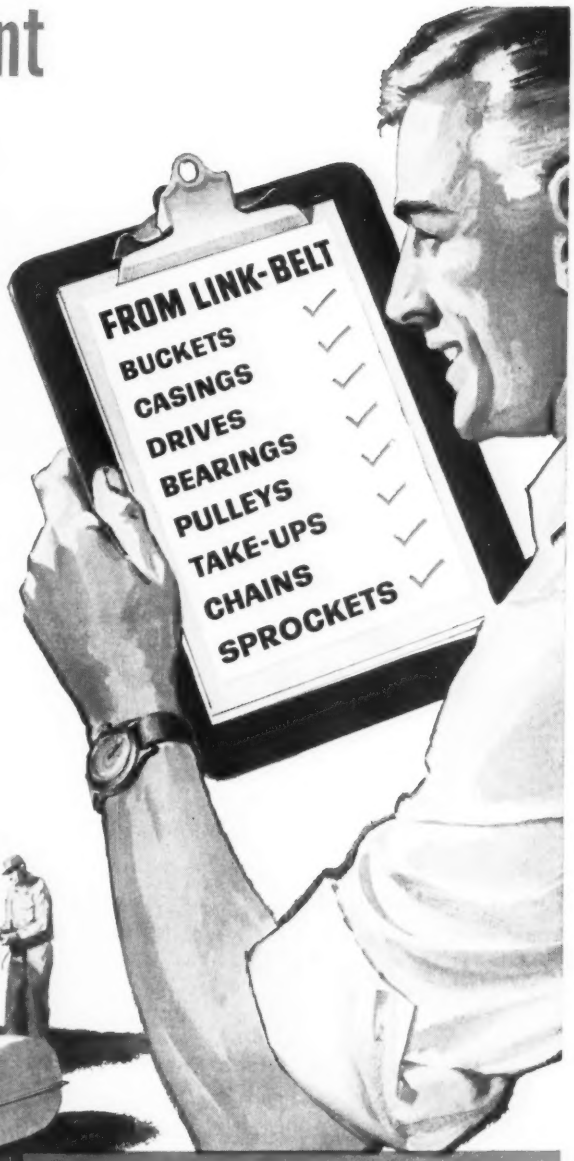
*of Mishawaka, Ind.*

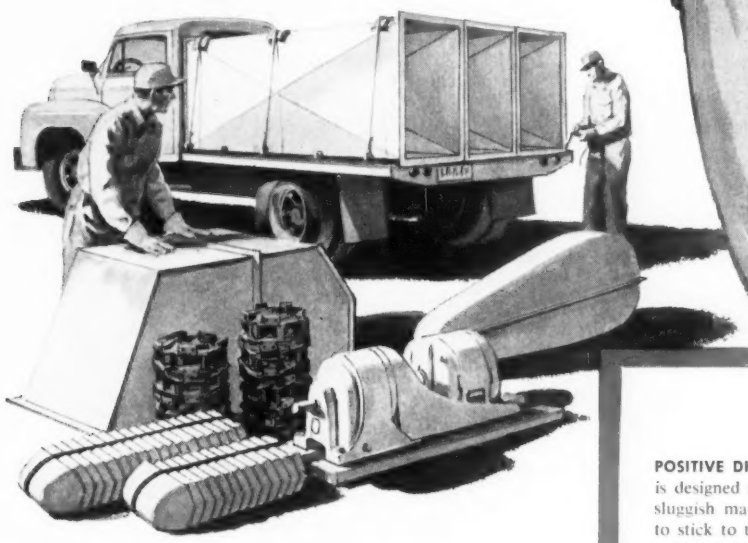
# One call, one shipment ...one complete bucket elevator

**LINK-BELT makes all bucket elevator components ... all integrated to match perfectly, operate smoothly**

There's no delay, no purchasing or installation problems when you call on Link-Belt for your bucket elevator. And when it's up, you can count on long-term elevating efficiency. Reason: Link-Belt makes *everything that goes into a bucket elevator* . . . from head to boot! By carefully designing, manufacturing and integrating all components, Link-Belt minimizes erection time and costs . . . avoids misalignment that causes inefficiency, bucket and casing wear.

At your request, Link-Belt will gladly erect your elevator and accept full installation responsibility. For complete details, contact your nearest Link-Belt office.



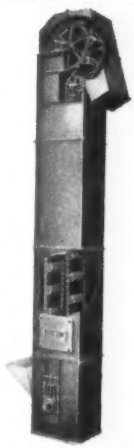



LINK-BELT

BUCKET ELEVATORS

**POSITIVE DISCHARGE** bucket elevator is designed to handle light, friable or sluggish materials, and those tending to stick to the buckets.

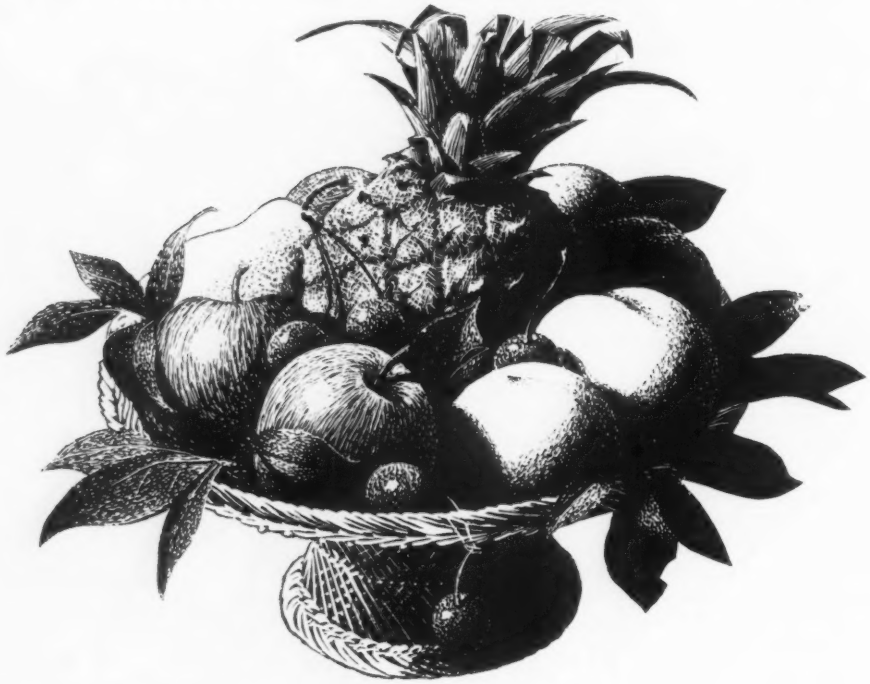
Link-Belt's complete bucket elevator line includes 14 types in 4 basic designs . . . centrifugal, positive, continuous and internal discharge. Also a wide variety of buckets. . . steel, malleable iron, Promal or alloy metals. With this broad selection, Link-Belt can provide the proper elevator and components to meet any material and capacity requirement.



**LINK-BELT COMPANY:** Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,253

**Q:** What can make these good foods better?

**A:** Roche *l*-ascorbic acid (vitamin C).



Small quantities of Roche *l*-ascorbic acid, added during processing, help retain the natural color and flavor of fruits and other foods by retarding oxidation. Thus the foods look better and taste better. Retail customers like them better and buy more.

Many food processors have improved their good foods with the help of our expert technical personnel. You can rely on us to assist you, too. Why not drop us a line for information about the use of Roche *l*-ascorbic acid (vitamin C) in your processed foods?

**Quick Facts about *l*-Ascorbic Acid (Vitamin C)**

*Roche l-ascorbic acid, as an antioxidant, protects natural color and flavor at low cost — in frozen apples, apple sauce, apricots, sweet cherries, fruit cocktail, nectarines, peaches, pears, pineapple, fresh prunes (Italian plums) . . . in frozen purees of peaches, bananas, apricots, nectarines, and pears . . . in fresh fruit salads . . . in fluid, frozen, and dried whole milk . . . in frozen fillets of salmon, mackerel, rockfish, white fish, lake trout, and in frozen swordfish steaks . . . in ice cream . . . in packaged beer . . . in citrus oil emulsions.*

Trademark: Roche®

# ROCHE *l*-ASCORBIC ACID

VITAMIN DIVISION • **HOFFMANN-LA ROCHE INC.** • NUTLEY 10, N. J.

In Canada: Hoffmann-La Roche Limited, Vitamin Place, 1956 Bourdon Street, St. Laurent, Montreal 9, P. Q.

ROCHE ROUND THE WORLD

AFFILIATED COMPANIES: BASEL • BOGOTA • BOMBAY • BRUSSELS • BUENOS AIRES • GRENZACH (GERMANY) • HAVANA • ISTANBUL • JOHANNESBURG • LONDON MADRID • MEXICO CITY • MILAN • MONTEVIDEO • PARIS • RIO DE JANEIRO • STOCKHOLM • SYDNEY • TOKYO • VIENNA • AGENCIES IN OTHER COUNTRIES

# DEVELOPMENTS TO WATCH

SPECIAL FOOD SERVICE to EXECUTIVES

**Continuous freeze-dryer with 50-ton daily capacity is offered** by German firm, Leybold Hochvakuum Anlagen, Cologne. Dutch firm is freeze-drying soups; German and French companies, vegetable and meat preparations. Wide range of foods have been processed experimentally.

**Freeze-concentration under nitrogen blanket will be used for entire** retail pack of Minute Maid and Snow Crop orange concentrates next season.

**Schweppes has installed automatic titration analyzer that periodically takes** samples from production line. Eliminates tedious lab testing, gives closer control through continuous record, and warns of quality changes.

**Continuous, self-cleaning belt filter for first carbonate juices of sugar** beets eliminates tray thickener, mud filter, secondary heater, and polishing filter. Also saves labor, and reduces loss of sugar by inversion.

**Titanium process kettle resisted corrosion in severe 2,000-hr. test** in Heinz plants. It was used for pickles, sauces, relish, ketchup, and strained foods. Metal withstood cleaning with caustic solutions.

**Continuous weigher developed in East Germany has two traveling belts.** Top belt feeds material onto constant-speed, scale-mounted belt below. If weight on scale belt varies, feed belt automatically speeds or slows.

**Potato dehydration time is cut from 4 hr. to 1 hr. in Idaho plant** by belt-through dryer that replaces aluminum tray unit. Heated air blows through product layer carried in trough formed by stainless mesh belt.

**Citric acid is produced by deep-fermentation from low-cost crude blackstrap** molasses in new 17-million-lb.-per-year plant built by Bzura Chemical. Quick fermentation achieved by mold treatment and temperature, pressure control.

**Sodium caseinate with 94 to 96% protein for enrichment is produced** by exclusive process in new 6-million-lb.-per-year plant of Certified Proteins. Under development is use to clarify white wines and vinegar, for air entrapment in chocolate bars, and as fat emulsifier.

See Who's Building What p. 17

**Palatable white algae for space food is produced at Boeing by blanching** green algae under fluorescent lights.

**In determining why hamsters fed Texas corn and milk developed 40% less** dental decay, MIT researcher found phosphorus to be anti-decay factor.

**Polyethylene with small crystals for clarity and less crystallization** for high tear, puncture, impact strengths is Spencer Chemical development.

**Fragrant polyethylene for nose-appeal packaging is available with scents** of chocolate, spearmint, cookies, orange, lemon, lime, strawberry, and raspberry. Onion will be added if FDA approves, says Fragrance Process Co.

Washington Report p. 19

**Effectiveness of process for removing pesticides from foods can be gaged** with radioactive tracers, says AEC. In Australia, radioactive Bromine 82 tested performance of sugar mill subsider that removes impurities.

**Food plant smokestacks now may be beautiful. They can be richly colored** outside and in with corrosion-resistant glass liner by A. O. Smith Corp.

• With a refrigerator full of valuable produce, frozen foods and dairy-cooler items, you can't afford to take chances. That's why the management of Roundy's Better Foods, Milwaukee wholesale food merchants, approached the refrigeration problem of their new perishable food warehouse with a completely open mind.

• From the very beginning, the Roundy people and their architect, Charles Nagel and Associates, decided they wanted a refrigeration installation second to none—one that would meet all demands placed upon it—a flexible, dependable, efficient system with built-in safety and "insurance" features. Their selection was Vilter.

• The installation is a two-stage, Refrigerant-22 direct expansion system. All compressors are Vilter VMCs, for both the second stage and booster stage. Three refrigeration systems are employed—a special system for the banana rooms; a high temperature system for the general assembly, poultry, dairy and produce rooms; and a low temperature system for holding frozen fruits and vegetables, sea food, packaged meats and specialties. The latter two combine to form the two-stage system. The units are cross-connected for emergency service.

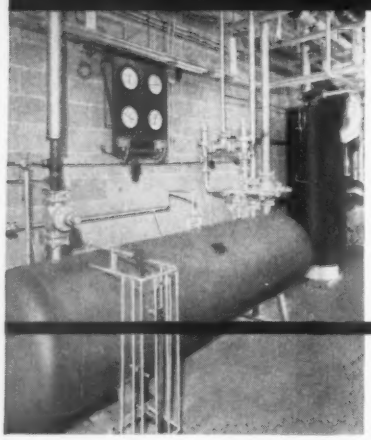
• The engine room is located next to the office. Smooth running Vilter compressors transmit no noise or vibration to any part of the building.

• All concerned have expressed complete satisfaction with the performance of the Vilter installation.

• Vilter VMC compressors deliver an excellent return for each refrigeration dollar invested—more capacity in less space; smooth running, reliable performance; easy-to-service design; built-in automatic capacity reduction.

• If you, too, want proven operation and efficient performance in your refrigeration equipment, and the benefit of experienced installation counsel, see your nearest Vilter representative or distributor today or write us directly.

# HOW TO COLD



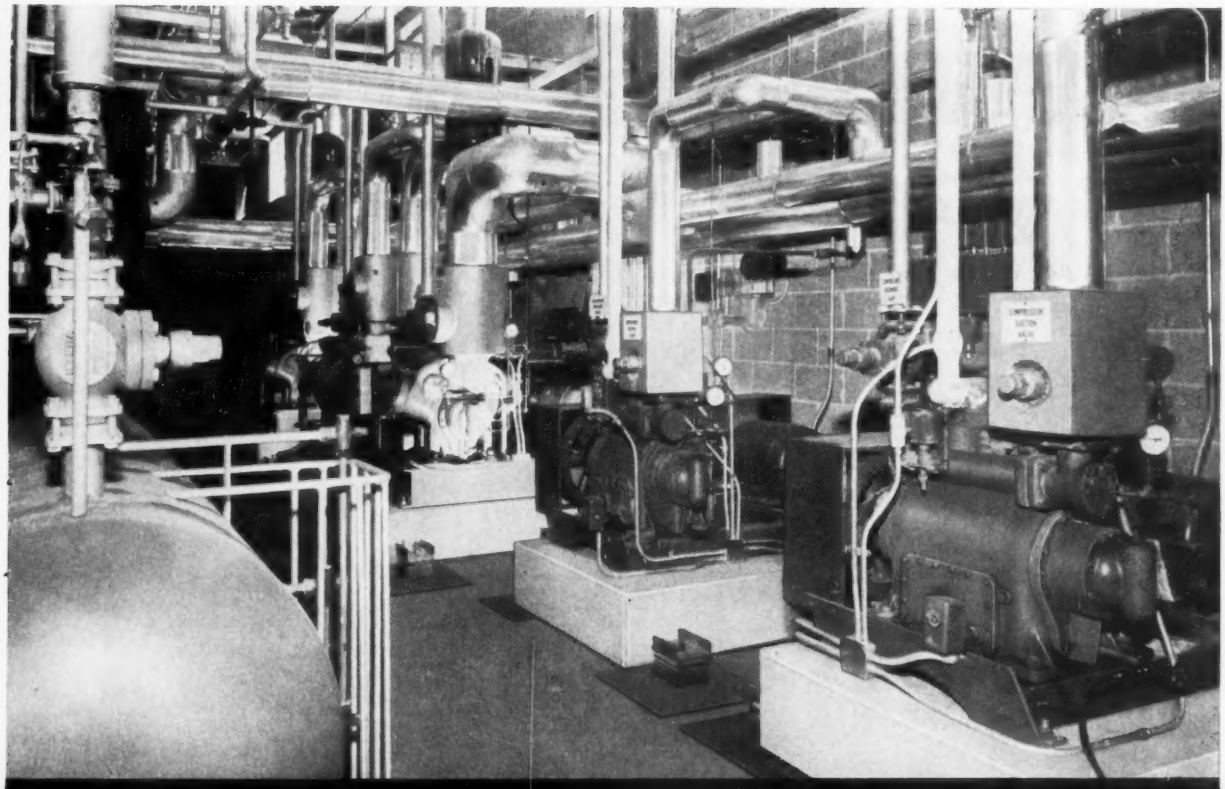
• Another view of the Roundy engine room. The vessel in the foreground is the refrigerant receiver while the vertical vessel in the background is an intercooler which increases the overall efficiency of the installation. The gauge board provides the operating engineer with a convenient means of checking the system's operation.

• In the produce room shown at right, and in the general assembly room, dairy cooler, and meat cooler, 5400 lineal feet of Vilter Zer-O-Disc fin coils are used. The entire system employs automatic hot gas defrost and is so arranged that not one degree temperature is lost during defrost periods. This is possible because of an ample number of coil circuits.

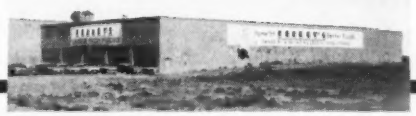
Correct temperature and humidity are maintained in these four rooms because the Vilter Zer-O-Disc finned cooling coils produce slow, even, positive air circulation naturally by convection.

• In the frozen food storage room handled by the low-temperature refrigeration system, large-size air units are used. The correctly sized duct work and anemostats produce outstanding results for proper air distribution. Room temperature does not vary one degree.

In each of the six banana rooms (not shown) are individual Vilter air units with both cooling and heating coils. Due to the occasional use of ethylene gas in the banana ripening process, explosion-proof motors and controls are employed.



# PROTECT
## $300,000 OF PERISHABLE FOODS



• This view of the engine room in the perishable storage unit of the new warehouse shows the five Vilter VMC compressors employed in the two-stage direct expansion Refrigerant-22 system: an 8-cylinder booster; two 2-cylinder and two 8-cylinder high stage units. Use of Refrigerant-22 has resulted in good efficiency and economy of operation.

The proper design, painstaking fabrication and careful assembly of Vilter compressors produce dependable units good for years and years of day-in-day-out operation. Vilter units are thoroughly factory-tested and run-in for immediate on-job operation.

• Here is the new home of Roundy's Better Foods in Milwaukee. It is one of the largest in Wisconsin and one of the finest wholesale food warehouses in the U.S. It supplies 350 member stores doing over $146,000,000 of retail business yearly. Lower view shows the latest addition; a perishable storage area containing 62,000 square feet of refrigerated space. There are separate cold storage rooms for produce; dairy products; meat; poultry; bananas; frozen sea food, meats, vegetables, fruit; and general assembly and storage. $300,000 of perishable foods is held here during peak periods. To protect this investment, reliable Vilter refrigeration is used throughout. Note the Vilter evaporative-condenser on the roof.

Vilter® refrigeration air conditioning

**The Vilter Manufacturing Company**
**Milwaukee 7, Wisconsin**

Air Units • Ammonia and Freon Compressors • Booster Compressors Baudelot Coolers • Water and Brine Coolers • Blast Freezers Evaporative and Shell and Tube Condensers • Pipe Coils Valves and Fittings • Pakice and Polarflake Ice machines.

**Write for Vilter bulletins to:**
**The Vilter Manufacturing Company, Dept. E-907**
**2217 S. First Street, Milwaukee 7, Wisconsin**

Bulletin 820 VMC Freon Compressors

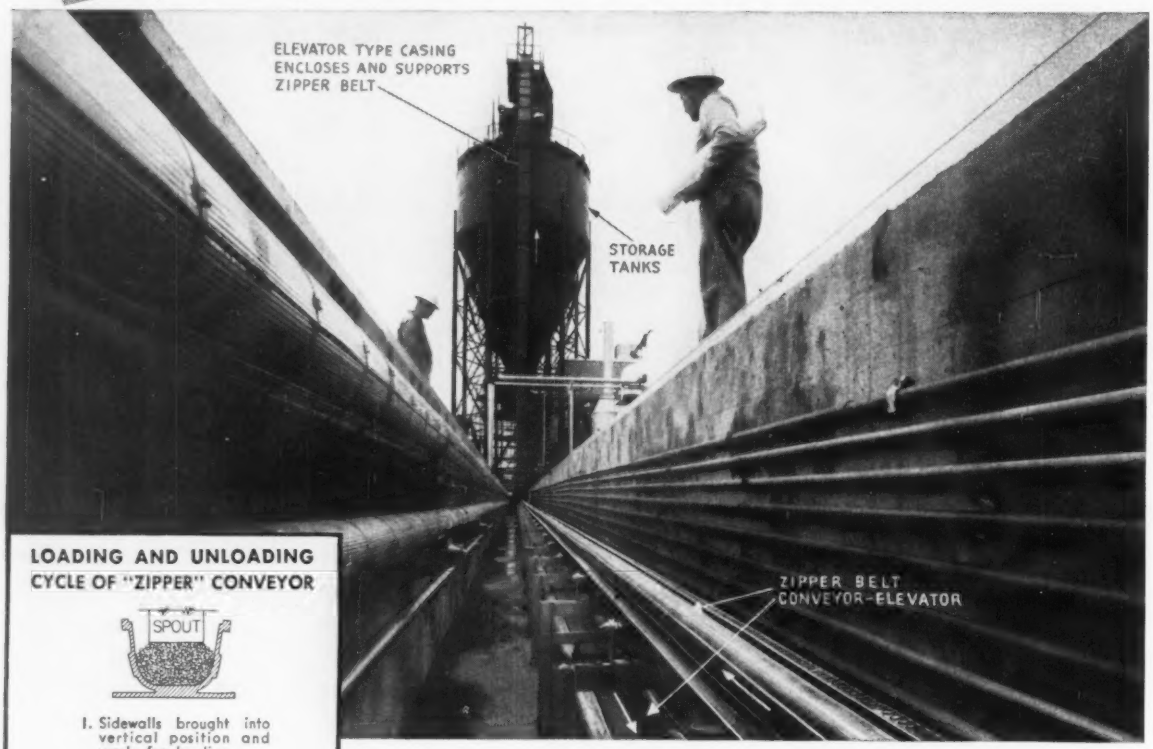
Bulletin 932 Evaporative Condensers

Bulletin 518 Zer-O-Disc Fin Coils

# STEPHENS-ADAMSON

EXCLUSIVE

## "ZIPPER"* CLOSED-BELT CONVEYOR-ELEVATORS



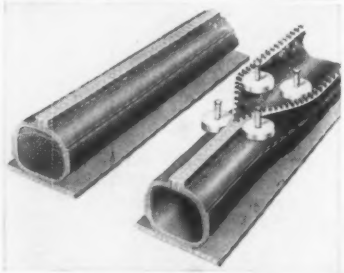

**LOADING AND UNLOADING CYCLE OF "ZIPPER" CONVEYOR**




1. Sidewalls brought into vertical position and ready for loading.

2. Flexible tube completely closed for conveying and elevating.

3. Rubber ZIPPER belt open for discharge, cleaning and return run.



Upper left unit closed and loaded. Lower right shows how belt is opened and closed by system of ball bearing rollers. (Rollers are mounted on a rigid framework)

### CONVEYS AND ELEVATES BY CONTINUALLY WRAPPING MATERIAL IN A PACKAGE... MOVING THE PACKAGE AND ITS CONTENTS TO A NEW LOCATION AND GENTLY UNWRAPPING IT!

Literally a moving material-carrying conduit, the ZIPPER Conveyor is capable of transporting bulk materials in any plane, to considerable heights and around obstructions. Its great advantage is that bulk materials may be conveyed within the belt completely sealed and dust-tight. Material doesn't slide, isn't scooped, pushed or thrown but is gently carried over great distances without breakage, agitation or segregation. The ZIPPER Conveyor-Elevator provides versatility of layout and profitable material handling advantages you won't want to overlook.

*PATENTED

**WRITE FOR BULLETIN 349**

S-A

**ENGINEERING DIVISION**
**STEPHENS-ADAMSON MFG. CO.**
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PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA • CLARKSDALE, MISSISSIPPI
BELLEVILLE, ONTARIO

# WHO'S BUILDING WHAT...

**Monthly Report: Food firms to spend $34,430,000 for expansion**

## Proposed Work

**Anheuser-Busch, Inc.,** Houston, brewery facilities, $22,625,000.

**Carolina Milk Producers Assn.,** Greensboro, N. C., warehouse and office, $150,000.

**Coca Cola Bottling Co.,** Silver Springs, Md., processing plant, $1,000,000; Alexandria, Va., processing plant, $1,500,000.

**Elm Farms Food Co.,** Brighton, Mass., warehouse, $116,000.

**National Biscuit Co.,** Stamford, Conn., warehouse, $110,000.

**Pillsbury Co.,** Bridgeton, Mo., processing plant, $5,000,000.

**Remington's Dairy, Inc.,** West Warwick, R. I., dairy, $115,000.

**River Brand Rice Mills,** Houston, plant, $1,250,000.

**Royal Crown Cola Co.,** Granite City, Ill., plant, $1,400,000.

**Sealtest Ice Cream Corp.,** Waterford, Conn., plant, $110,000.

## Contracts Awarded

**Ace Beverage Co.,** Los Angeles, warehouse, $160,000.

**Coca Cola Bottling Co.,** Angleton, Tex., bottling plant and warehouse, $125,000.

**J. A. Folger & Co.,** New Orleans, coffee plant, $1,691,900.

**Mrs. Kinser's Home Style Salads,** Atlanta, Ga., processing plant, $125,000.

**Regal Fruit Cooperative,** Tonasket, Wash., cold storage plant and packing room, $204,606.

**Strietman Biscuit Co.,** Greenville, S. C., warehouse and office, $125,000.

**Wass Food Products Co.,** Chicago, Ill., processing plant, $420,000.

**Stephen F. Whitman & Son, Inc.,** Philadelphia, candy manufacturing plant, $4,250,000.

## Others

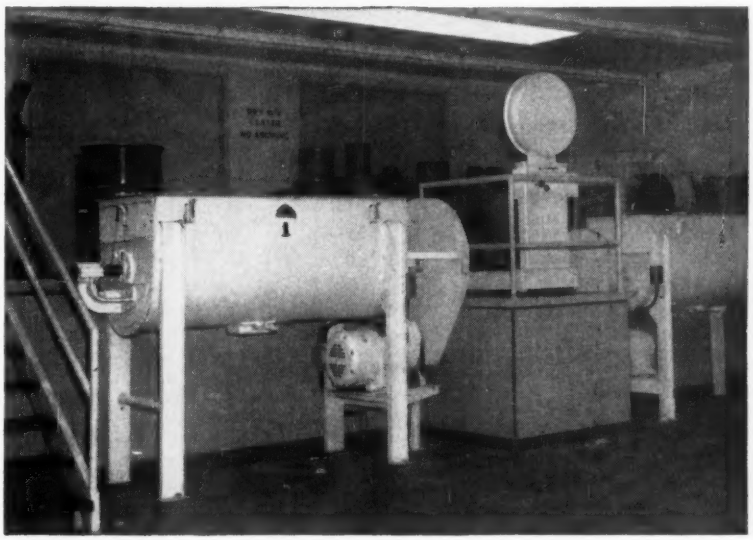
**Pepsi Cola Bottling Co.** has received a low bid of $1,054,000 for construction of warehouse and plant in Cheverly, Md.

**Campbell Soups Co.** is expected to build a multi-million dollar plant near Paris, Tex.


DAY mixes

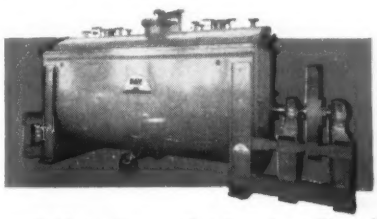
in the best companies

Fearn Foods Inc. is one of thousands of old friends. They've used DAY Ribbon Blenders for years in their Franklin Park, Illinois, plant.



When the decision on what make of blenders to buy for their new modern Los Angeles plant came up, they just ordered three more DAY blenders. The reason — simply that DAY blenders have always given dependable trouble-free service. They operate smoothly, rapidly and efficiently. Their many features include outboard bearings that provide sturdy support for a solid alloy steel shaft. Stuffing boxes of sanitary seals for protecting bearings, prevent product contamination. They have a geared head motor, roller chain drive, galvanized or stainless tank, choice of agitators. Heating or cooling jackets optional. There is a complete line of DAY ribbon blenders available in capacities of 10 to 465 gal.

On the right is a DAY mixer from the Jumbo line. These rugged brutes are built for extra heavy loads. Capacities 600 to 3850 gal. Complete lab facilities available for testing your product.



Join the many companies now enjoying the production benefits of DAY blenders and mixers. Write today for Bulletin 800.

*The* **J. H. DAY** *Co.*

*Division of The Cleveland Automatic Machine Co.*
SERVING THE PROCESS INDUSTRY SINCE 1887
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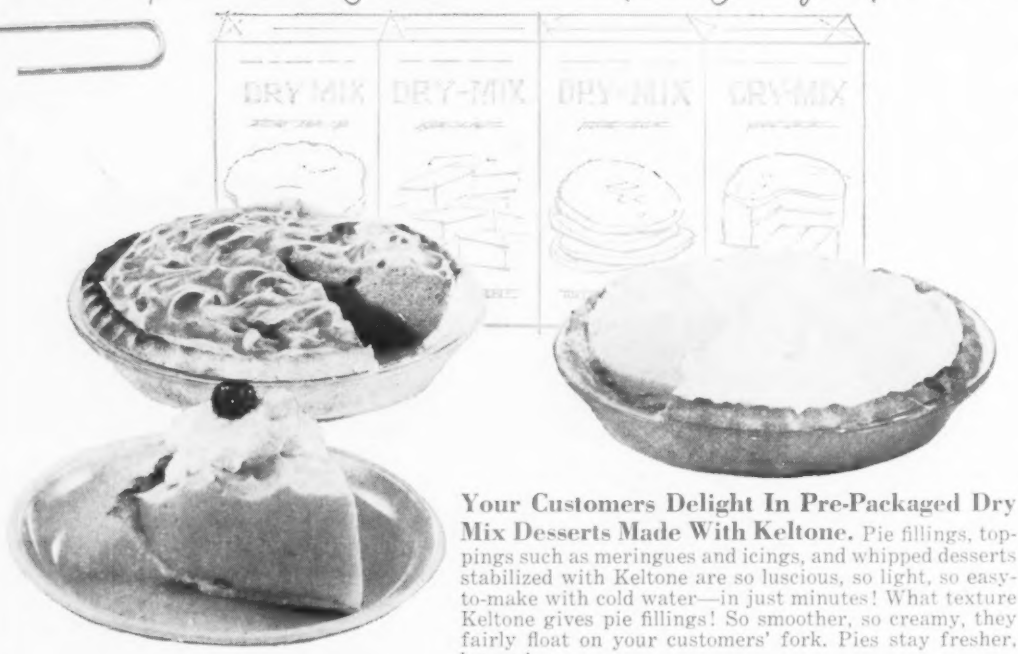
KELCO COMPANY NEW YORK CHICAGO LOS ANGELES

KELCO REG. U.S. PAT. OFF. REFINED ALGIN PRODUCTS

technical bulletin

*Use unique Kelco Algin Colloids to improve your food products*




**Your Customers Delight In Pre-Packaged Dry Mix Desserts Made With Keltone.** Pie fillings, toppings such as meringues and icings, and whipped desserts stabilized with Keltone are so luscious, so light, so easy-to-make with cold water—in just minutes! What texture Keltone gives pie fillings! So smoother, so creamy, they fairly float on your customers' fork. Pies stay fresher, longer!

# A Vital Ingredient In a Pre-Packaged Dry Mix

Wherever water, milk or other aqueous media are added to your packaged dry mixes, you achieve important benefits in improved body and consistency, more effectively stabilized emulsions, and minimized loss of moisture or migration by using Kelco algin in your packaged dry mix.

**YOURS ON REQUEST:** Free samples of Kelco algin, and Technical Data describing properties and advantages, for *your* application. Write without obligation to your nearest Kelco regional office.

**Use Keltose or Kelcoloid HVF, other unique Kelco algin products, for dry mix icings.**

With Keltose in the formula, icings are retained on cake surfaces with greater gloss and stability. Stickiness of the icing is reduced so that it does not tend to adhere to wrapping. Cracking and peeling during exposure is reduced, drying out of icings prevented.

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## Additives Pass D-Day–Check on Score

FDA's tight-strung Deadline-Day for proving the safety of additives–Mar. 5–found tempers of industry men somewhat smoother.

In the closing days, Agency officials gave soothing assurances that few, if any, products would be banned.

**Even so, this melee has caused makers and users of additives a long run of headaches. And a good number of them are far from cured.**

Of the 1,000-plus additives, 352 have been exempted from testing–generally recognized as safe (see additional listings, p. 89). Meanwhile, some 600 petitions for either clearance or extension of time were on file.

Though only a handful of the latter had been approved in the last-minute deluge, FDA said it didn't expect to take action against anyone who has filed–unless solid evidence of possible hazard shows up.

**But don't take any of this as a "softening." For HEW Secretary Flemming emphasizes he'll hold to the additives law as written, and he believes FDA has authority to ban all food carcinogens even without a Delaney clause.**

## Ike Launches Special Additives Study

White House action now expresses the deep concern over the food additives mess.

The President is setting up a committee of scientists to study the whole question. This group likely will comprise experts from both industry and universities acting as a special panel of the Science Advisory Committee.

**The project stems from demands of farm groups, working through USDA Secretary Benson. Hard hit by HEW Secretary Flemming's cranberry and caponette rulings, these interests hope for higher influences that will insure against further market calamities.**

Initially, the panel will evaluate reports on specific factors now being collated by Government scientists at the President's request.

## Color Hearings Ending; See Bill Sped

Now tagged as a "must" for fast movement is food-and-drug color legislation.

The hearings before the House Commerce Committee are coming to a close, and Chairman Oren Harris favors speeding of a bill before any more incidents (such as the "lipstick ban") can arise.

**Once approved by the Committee, the bill should have no trouble getting directly to the White House for signature.**

## New QM Ray Plan . . . Lo-Beam Project

Army's QM Corps–unhappy over abandonment of the Lathrop, Calif., food raying program (FE Feb., p. 19)–now recommends construction of a smaller experimental million-curie cobalt-60 food irradiator.

**Such a "second start"–a $2-million project–reputedly has the blessing of Army Research & Development Chief Richard Morse, the man who cancelled the more ambitious $7.5-million California center.**

The bigger project, he felt, skipped too far over current fundamental problems faced in ray preservation.

Congress will be asked to approve the new QM plan this session–as a means of getting on directly with the task of finding answers to key technical and economic questions about radiation preservation.

Site of the irradiator hasn't been selected, though a New England location is considered likely.

**Meantime, a separate "civilian" program checking on low-energy raying of food is being weighed by the Interdepartmental Committee on Radiation Preservation.**

AEC's Dr. Paul Aebersold says this would encompass "food chemistry, product development, nuclear effects, process engineering, packaging, and supplementary wholesomeness." Fish and fruit would likely be accented rather than meat.

Funds for this project, however, don't appear to be in sight before fiscal 1962.

## Reds Seeking Our Food Techniques

Russia and her satellites are evidencing an interest in buying U. S. technical processing data and know-how in consumer-product categories.

**Some of their calls have related to agricultural items, and bids concerning food processing are said to be coming up.**

Reflecting this development is a recent Commerce Dept. report listing nine approvals granted U. S. exporters for delivery of various technical material and data to Iron Curtain countries.

No dollar values were given, but Commerce Secretary Mueller says the deals could run into several million dollars.

On calls involving strategic or military materials, however, U. S. policy remains tough. This same report noted a number of rejections of applications in these sensitive spheres.

## BRIEFS

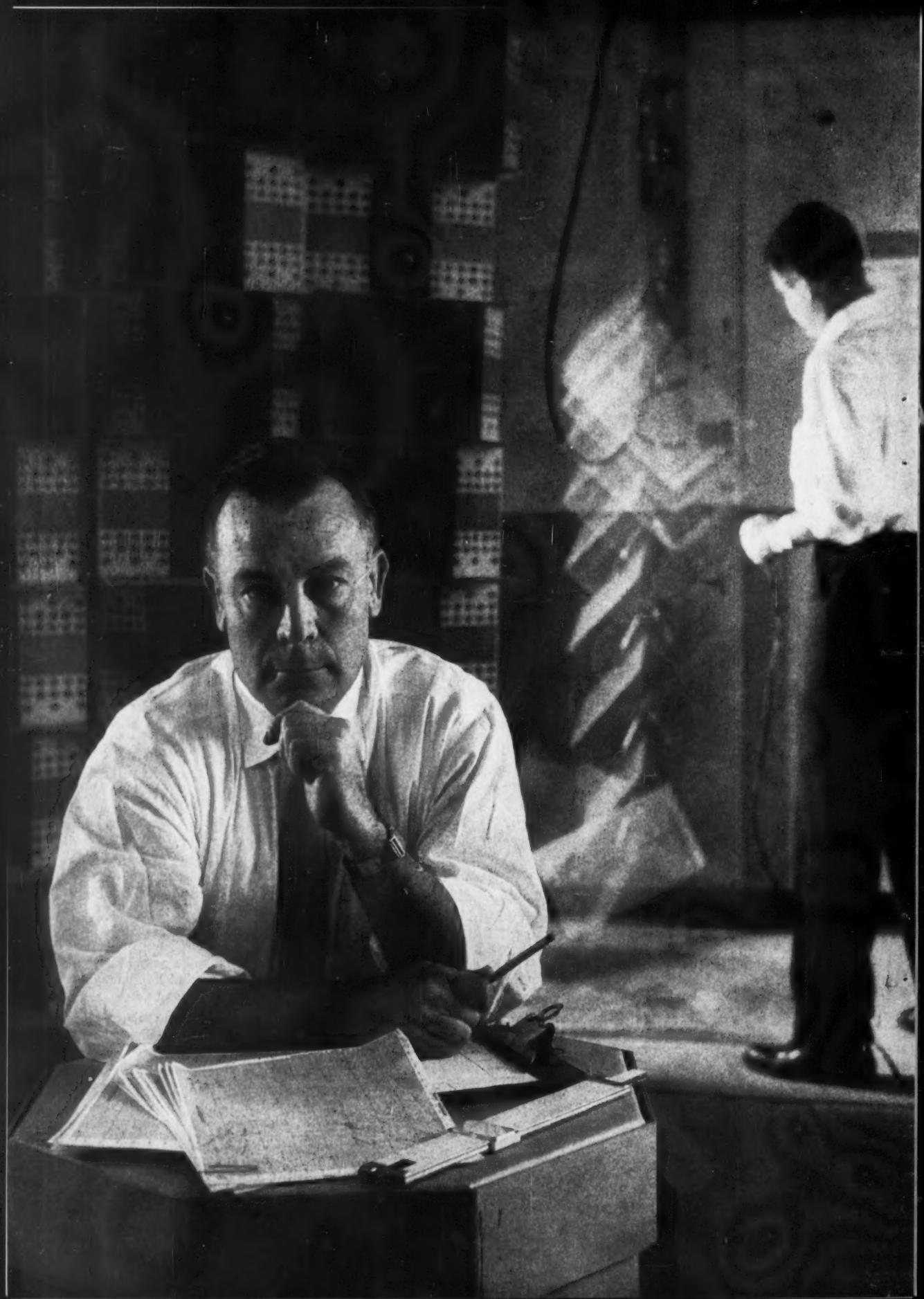
**Handiest additives-check reference** is "Principles & Procedures for Evaluating the Safety of Food Additives." It's a compact 10-page booklet you can get free from The National Academy of Sciences, National Research Council, 2101 Connecticut Ave., Washington, D. C.

**Re "questionable" wholesale-retail practices,** you can look any day now for FTC to spring Chapter I of its long-awaited "economic concentration" report (FE Feb. & Oct. '59). And chances are that a hot headline will herald it–judging from past FTC performance.

**A new FDA laboratory-office building** is projected in Washington, D. C., under provisions of the fiscal-'61 budget. To pay for it, $23.8 million has been checkmarked in the General Services Administration listings.

**First new butter grade standards since '54** become effective Apr. 1–more tightly defining quality characteristics and narrowing allowable workmanship defects relative to body, color, and salt.

**Latest spark to overseas trade** is word that Britain has now removed quantitative restrictions on dollar imports of fresh and frozen fish.



# His specialty is collision insurance

And making sure you don't collect on it.

With Thorne Kitchel there's precious little chance. The crash program he puts your containers through assures that the design and construction are adequate for your product before production begins.

Thorne heads up a team of seasoned "security analysts" at Union-Camp's packaging laboratory. In his 15 years as a corrugated box specialist, he has tested thousands of boxes designed to protect all kinds of products. He's also helped save thousands of damage-claim dollars for their owners in the process.

At the Union-Camp packaging proving ground, Thorne and his staff test new shipping containers for their ability to withstand almost any conceivable threat to product safety. Sudden rail-car stops and starts, for example. Punctures from sharp objects. Resistance to extremes of temperature. Accidental falls. Vibration. Or the extent to which a shipping container will protect your products under the crushing pressure of high stacking.

Even the components and materials that go into your box must run the gauntlet before they are used. They are tested individually—then in relation to each other to determine the combination of properties that will insure maximum safety for your product . . . whatever it may be, wherever it may be shipped.

This comprehensive quality control program is just one part of Union-Camp's complete corrugated service available to all shippers. The service also includes box development and design—both construction and visual. It provides specifications control, art and merchandising counsel as well as a study of your packaging operation and many other features that can help you move and market your products more effectively, more economically. And it doesn't cost a penny extra.

Your Union-Camp man will be glad to give you full information. Case histories are on file that show what we have done for companies like yours. A note on your letterhead will bring a prompt reply.

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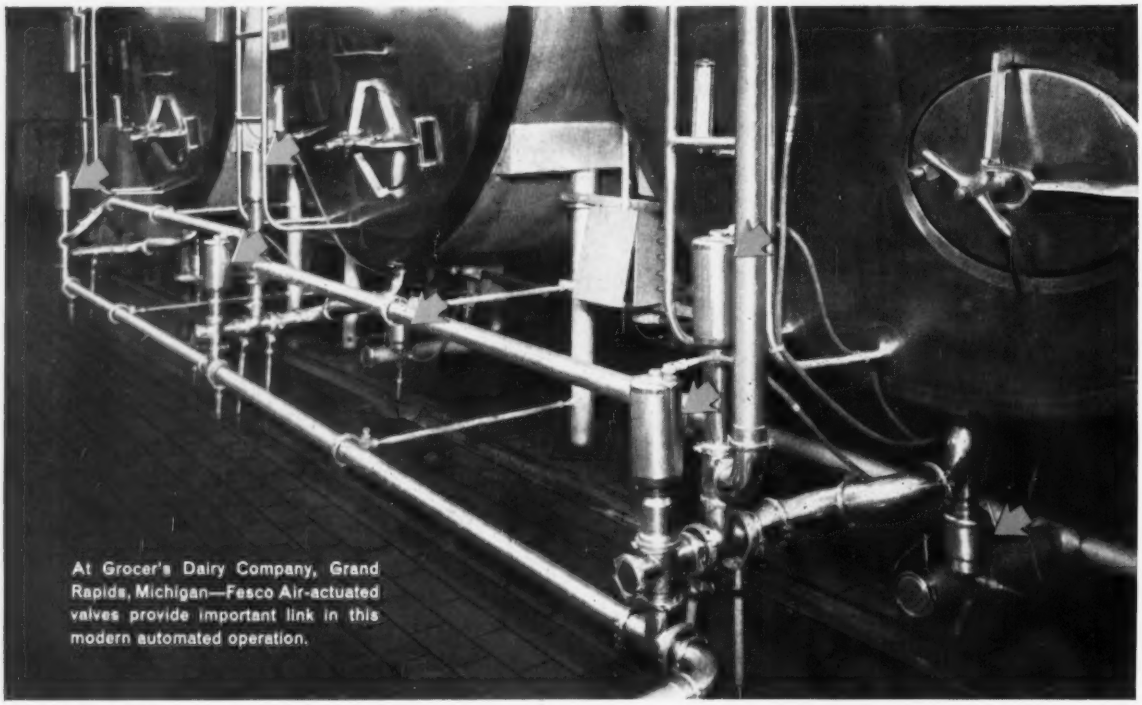
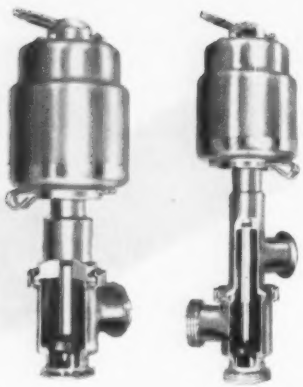
# Fesco AUTOMATIC AIR-ACTUATED VALVES



At Grocer's Dairy Company, Grand Rapids, Michigan—Fesco Air-actuated valves provide important link in this modern automated operation.

## The fast action, fast cleaning choice for automation



*Ask your nearest Tri-Clover Distributor about Fesco Valves, for either "C-I-P" or Processing operations. Or write Tri-Clover Division for detailed recommendations for your specific application.*

Wherever you find a need for accurately controlled automation of dairy, beverage or food processing operations you will find versatile, fast action Fesco Automatic Valves.

These efficient fast acting valves, manufactured by our Fesco Division (formerly Food Equipment and Specialties Co.), are backed by many years of practical experience and specialized knowledge in automatic control of processing and cleaning lines. The valves are available in all standard sanitary sizes for actuation by remote, manual or automatic control. Automatic process control can be achieved by pressure, temperature, flow or liquid level conditions, to meet your requirements.

The dependable actuator is easily coupled to the valve body for fast take-down and reassembly. All seats and O-ring seals are constructed of material having wide acceptance in the dairy and food fields and are unaffected by food or liquid products and cleaning solutions.

With the addition of Fesco Valves, Ladish Co. continues to keep pace with the latest technological advances in the Dairy, Food, Beverage and Chemical-Process Industries.

*See your nearest Tri-Clover Distributor.*

F-159

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**LADISH CO.**
*Tri-Clover Division*
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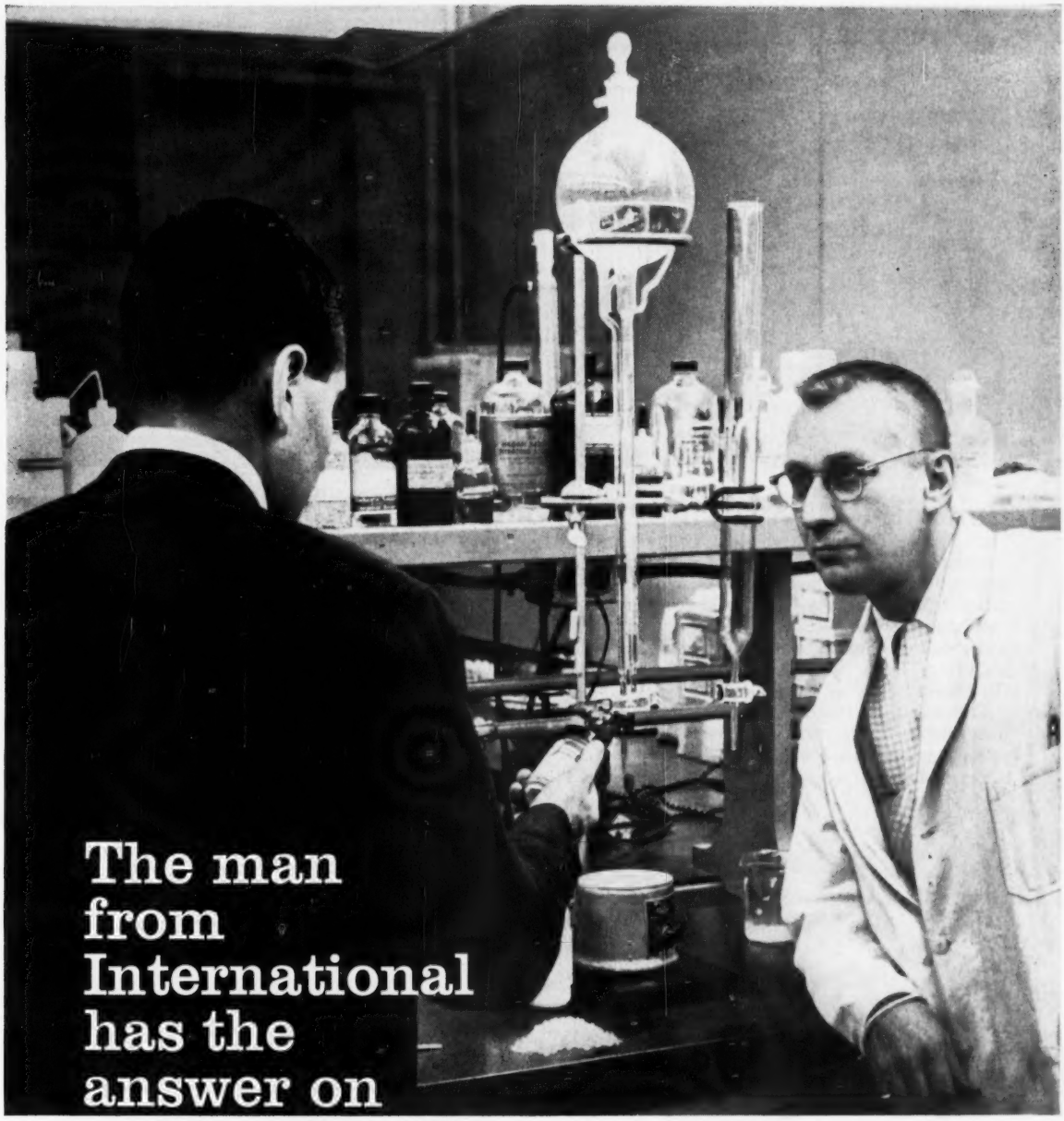
←CIRCLE 21 ON READER SERVICE CARD

CIRCLE 22 ON READER SERVICE CARD




# salt selection

The International Salt Company sales engineer is helping his customer choose the right salt and a matching salt-dissolving system for a new plant. His advice is sure to be impartial because International supplies Sterling Salt in over 80 different types. In this full line, there is a type and size of salt for every industrial need. The man from International can also suggest the most efficient and economical method of using, storing and handling the salt he recommends. His experience, knowledge and on-the-spot service are the vital extras that make Sterling Salt the first choice of so many salt-using companies. To put this technical knowledge at your disposal—contact International Salt Company headquarters, Clarks Summit, Pennsylvania, or the office nearest you: Boston, Buffalo, Charlotte, Chicago, Cincinnati, Detroit, Newark, New Orleans, New York, Philadelphia, Pittsburgh, St. Louis.

**INTERNATIONAL STERLING SALT SALT COMPANY**

"A STEP AHEAD IN SALT TECHNOLOGY"

# NEW PACKAGES & PRODUCTS

## Buitoni, Pet Milk Enter Economy Line Derby

Aiming for an even wider share of their particular market, two major premium-priced firms—Buitoni Foods and Pet Milk—are introducing new economy lines.

Under the Chef Marco label, Buitoni offers Ravioli with Meat in Sauce, Diavolo Sauce, All-purpose Sauce, and Pizza Sauce. Suggested retail prices: 30¢ for Ravioli (15¾-oz.) and 26¢ for sauces (10¾- oz.)

Pres. Giovanni Buitoni comments that his firm will now have its "Cadillacs" in the regular line and "Chevrolets" in the Chef Marco line.

Pet Milk, maker of premium Pet-Ritz Frozen Pies, joins the growing economy line list with new, popular-priced "Swiss Miss." Initial marketing in the Midwest features apple, peach, and cherry pies.

Seeing two levels in the frozen pie market, Pet plans to market its lines separately, although combined shipments will be offered.

Distinctive, full-color package of Pet's economy line displays pie slice and needlepoint illustration of costumed Swiss "miss."

Red, white, and green Chef Marco label has trademark of modern Italian chef.

### Modern Design Boosts Appeal

Following independent consumer research in several marketing areas, Borden Co. has introduced redesigned cartons for its full line of ice creams and sherbets.

New cartons will replace designs in use since 1955. Featuring full color photo of product against decorator background colors, package is hailed as superior in impulse appeal and high quality appearance.

Flavor identification for both rectangular and round type containers appears on all sides. Innovation is use of horizontal layout on main panel and vertical layout on opposite side.

Line comprises 11 color combinations.

### GF Introduces New Protein Line

Leadoff convenience product in General Foods' high-protein, New Horizon Foods line is the all-new Italian Casserole Mix.

Product, from the Jell-O Division, contains 31% more proteins and 56% less fat than similar dish with ½-lb. of chopped meat.

Described also as the first dry shelf product to offer a complete main-dish meal in itself, Casserole is now in Massachusetts, Kentucky, and Colorado markets.

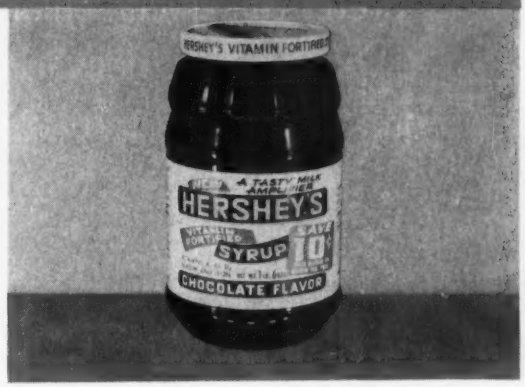
Mix, containing GF-developed protein morsels, is packed with aluminum-foil dish. On adding tomato sauce and water, the 8½-oz. package serves four.

## Family Labels Boost Identity

Switch to brighter, uniform labels, designed for strong color impact and flash identification, is planned for complete line of LaChoy Food Products.

Both 3-oz. and 6-oz. cans of Chow Mein Noodles and the No. 303 cans of Chop Suey Vegetables are now being dressed in the new design. Eventually, the move will affect the full line, including the 2-lb. 2-oz. economy sizes.

Design for all labels is basically red and white with a gold band dividing red bottom half from white top. Features include more attractive vignettes, neat and simple front panels, and improved brand logotype.




## New Hershey Syrup in Glass

Vitamin Fortified Chocolate Flavored Syrup, Hershey Chocolate Corp.'s first product in a glass container, is now in national distribution.

Jar, from Owens-Illinois Glass Co., has depressed panel for label space. Vertical ribbing at shoulder provides easy handling for housewife and excellent retail display stacking.

New syrup was developed as a milk amplifier, but market test reports from the New York-Philadelphia area indicate wide usage as an ice cream topping.

Containing vitamins A, $B_1$, $D_2$, plus niacin and iron, product retails at 49¢. Circle 402 on Reader Service Card

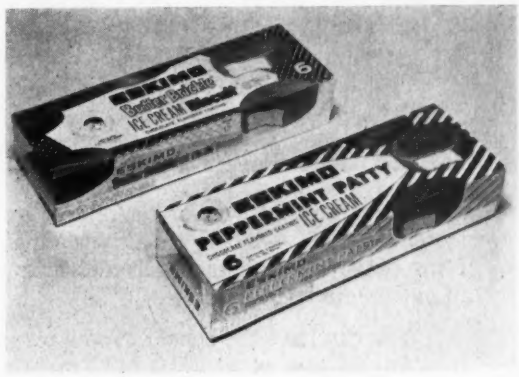
## New Design for Quality Snow Crop

Minute Maid's new "100% richer" Snow Crop frozen orange juice is making its New York-New England debut in a completely redesigned package.

New design emphasizes the quality process developed by MM which officials say produces juice that is "almost indistinguishable" from the home squeezed variety.

A "50% increase in visible orange pulp flavor cells," due to "radically different techniques for water removal," is the main reason for improved quality.

Snow Crop's new 3-panel horizontal label is crisp and uncluttered, with brand name in large easy-to-read letters on a medium blue background.




## Round Shape for Eskimo Pie Line

First two "round" ice cream products from Eskimo Pie Corp. are Peppermint Patty and Butter Brickle Biscuit.

The products, say Eskimo officials, represent "the first truly new shape for the ice cream confection field in more than 30 yr." Both are available as individual 2½-oz. bars or in 6-pack, take-home cartons.

Butter Brickle name stems from trademark of Fenn Bros., Sioux Falls, S. D., supplier of the toffee-style candy ingredient.

Attractively colored 14-oz. cartons are foil laminated from Reynolds Metals Co. Circle 403 on Reader Service Card

All Mathews conveyer systems aren't this spectacular, but they all deliver outstanding performance

• It's true that everyone can't use an order-selecting system like this — but — it's also true that everyone specifying conveying equipment has a right to expect this type of *outstanding performance.*

You can have the benefit of well-planned mechanized handling in *your* plant. Mathews Engineers would like to work with you in developing a conveying system that will create a smooth flow of *your* product — a system that will deliver outstanding performance *for you.*

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*Over Fifty Years of Leadership in Mechanized Handling*

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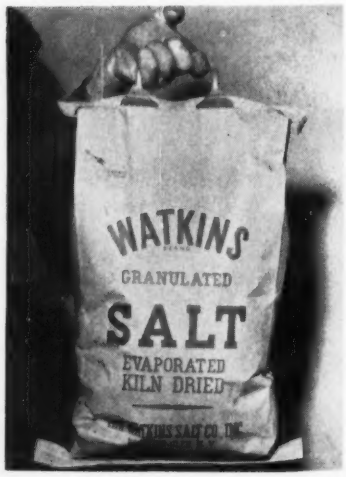


**PLASTIC HANDLE** is being used by Watkins Salt Co. for 25-lb. packages of granulated salt. Designed by St. Regis Paper Co. for multiwall-packaged consumer products, the injection-molded polyethylene handle is sewn into top of bag. (404)

## New Product Shorts

**Leaf Tarragon** in the Glass Pack Specialties line and economy size 3½-oz. jars of **Minced Onion** are latest items from R. T. French Co.

**Marshmallow Creme,** for baking, desserts, candy, and ice cream topping, is offered by Kraft Foods.

**Two additions** to Aunt Jemima Easy Mix line of Quaker Oats Co. are Choc-O-Chip Squares and Gingerbread.

**Famous Foods of the World** line from George A. Hormel Co. features Russian Beef Stroganoff, Swedish Kottbullar, Italian Chicken Cacciatore, French Onion Soup, and Spanish Garbanzo Soup.

**Frozen Pecan Pie** is newest Pet-Ritz product from Pet Milk Co.

## Packaging Briefs

**Traypacks** are now being used to ship and stack Libby, McNeill & Libby's line of canned meats.

**Guardsman,** a new 6-bottle soft drink or beer carrier, minimizes use of paperboard, speeds glueing-line operations. Ready-assembled carton is offered by Packaging Corp. of America. (405)

**Aromatic polyethylene films** and molded items are now available with wide variety of scents developed by U. S. Industrial Chemicals Co. (406)

**"Polymorphous"** polyethylene packaging film, from Spencer Chemical Co., is reported to have unusual strength and clarity. New process uses principle of controlling resin crystal size during film extrusion. (407)

# Just Between You and Your Customer

The sales success of any product depends upon the creation of a broad market of loyal customers. One of the custodians of this loyalty is your package . . . the protection it gives your product . . . its eye-appeal . . . its ability to stay clean and neat.

Riegel's business is helping to build customer loyalty, by developing and manufacturing packaging materials that never let your customers down. More than 600 available . . . papers, paperboards, foils, films and combinations . . . waxed, coated, plain, or printed. The right Riegel material helps your sales . . . at a cost that helps your profits. Write to Riegel Paper Corporation, 260 Madison Avenue, New York 16, N. Y.

EVERYTHING YOU NEED
APPIAN WAY
the original Pizza
MIX and SAUCE
APPIAN WAY
Pizza MIX
Dear Friend:
Just a short note this time to tell you not to miss the stocking offer on the back of this bag. Our wives and secretaries say the stockings wear very well. We say the stockings are very attractive.
Incidentally, Appian Way Pizza is not fattening, as you might think, because we always use lower calorie, higher protein flour. An independent laboratory found we had less calories than the other brands of pizza mix —even though our package contains as much or even more mix. Also, Appian Way has no hard-fat shortening, no synthetic flavorings, no questionable food additives — just good pure food.
CONTENTS 6½ OZ.
Enriched Flour
Dry Skimmed Milk
Sugar, Salt
Sincerely yours,
Food Specialties, Inc.
INTERNATIONAL PIZZA CLUB
P. O. Box 213, New York 1, New York
Send us your name and address and favorite P recipe and become a charter member of the Inter national Pizza Club with a handsome Official Membership Card. You will receive a $10.00 award if the Club publishes your recipe in its Newsletter to Members

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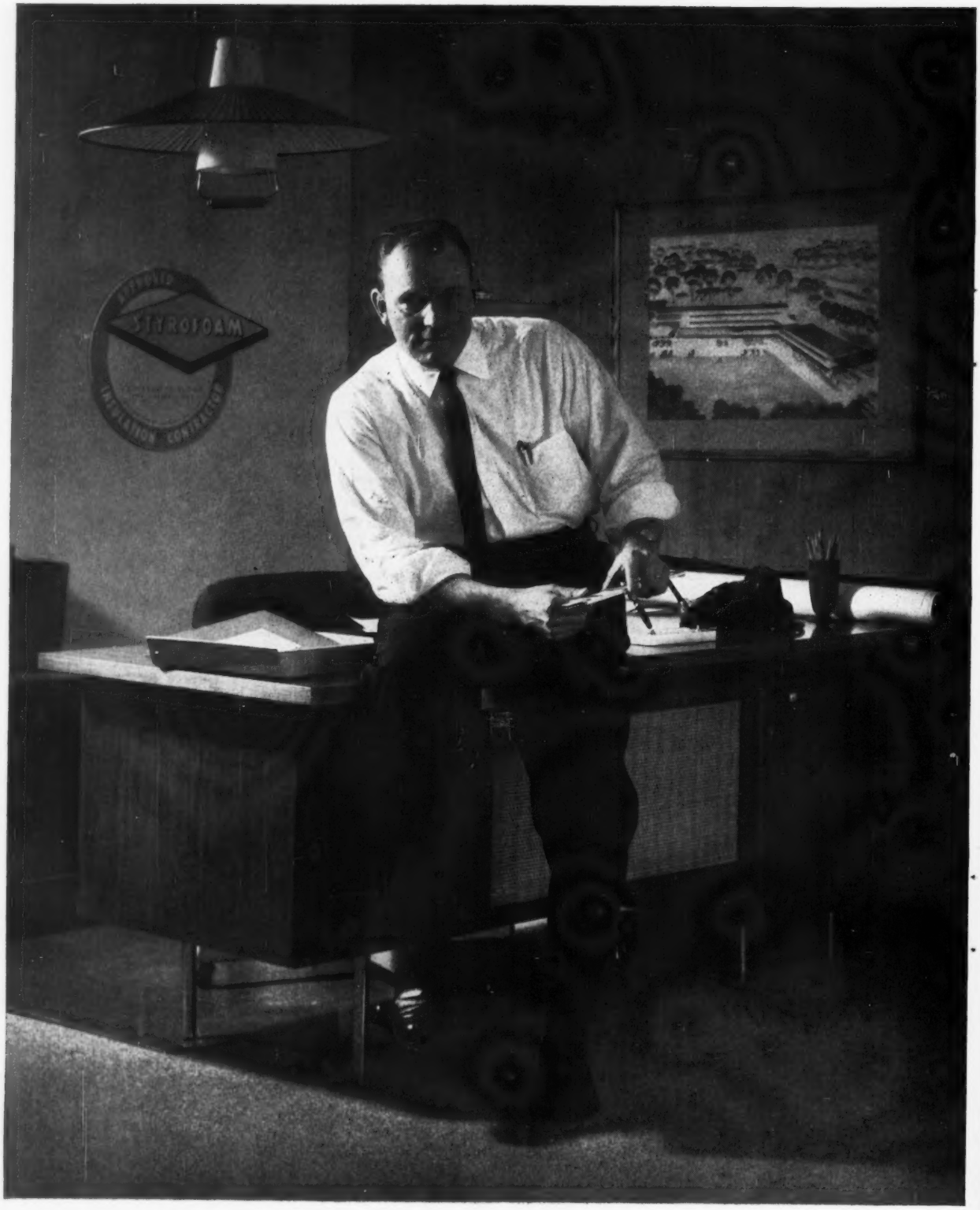
**PROTECTIVE PACKAGING MATERIALS**

Appian Way Pizza Mix is protected with a special bleached paper, printed and polycoated by Riegel, run at high-speed on Bartelt equipment.

DOW | INSULATION



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## AND LOW-TEMPERATURE INSTALLATION, TOO

HE'S AN APPROVED INSULATION CONTRACTOR, typical of the special group of low-temperature insulation contractors that Dow has selected for their outstanding experience and abilities in installing Styrofoam*. Each Approved Insulation Contractor listed below has a reputation for top-quality workmanship. All 84 of these firms are thoroughly familiar with Dow recommendations for installing Styrofoam, and they are committed to follow these recommendations on every job.

Consult an Approved Insulation Contractor when you're planning your next freezer or cooler room. The superior *insulating* performance of Styrofoam, teamed with the superior *installing* performance of an Approved Insulation Contractor, is your assurance of a top-quality job.

*DOW'S TRADEMARK FOR ITS EXPANDED POLYSTYRENE.

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**For the best low-temperature installation, get in touch with the Approved Insulation Contractor near you.**

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**Fresno**
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Los Angeles Cork Company, Inc.
Los Angeles Ind. Bldg. Materials, Inc.

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**FLORIDA**

**Haines City**
R & S Insulation Company

**Jacksonville**
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**Tampa**
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**Seattle**
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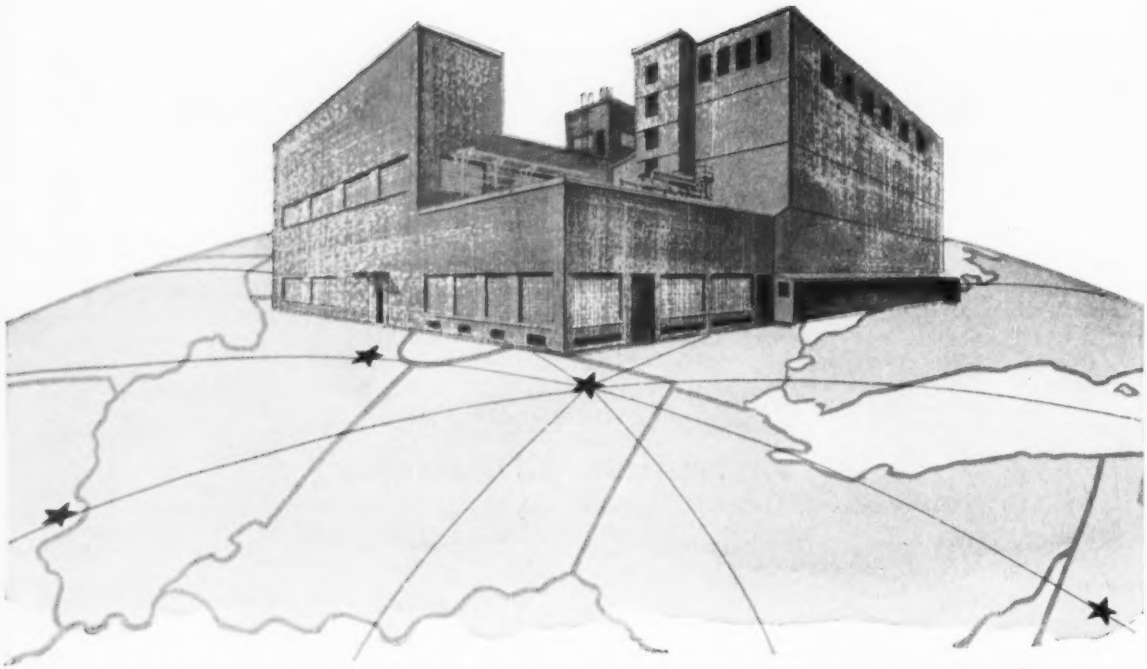
**THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN**



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## new basic source of citric acid U.S.P. is centrally located

Whatever you're looking for in citric acid . . . superb purity, swift service, or a reliable source . . . there are good reasons for getting better acquainted with Miles Chemical Company in the near future.

First of all, Miles citric acid U.S.P. is produced at a convenient Midwest location (Elkhart, Indiana). Rail and truck service in any direction . . . in *your* direction . . . is remarkably fast. The expanded plant capacity at Miles assures an abundant, ever-ready supply of citric acid which can be started to your receiving dock or siding within hours after your order is placed.

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Miles Chemical Company
division of Miles Laboratories, Inc.
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# Additives Defeat Industry on Several Scores

To develop a scorecard on the additives situation, and to spotlight industry thinking, FE confidentially questionnaired a number of leading food company executives.

Of 40 expressing opinions, only two completely approved the way the government has handled the additives problem recently. The other 38, or 95%, think the ball has been fumbled. Many fairly observe, however, that FDA previously had done a good job, but now is burdened with more than it can handle.

Here are the more common complaints: Hasty action on inconclusive evidence. Too much publicity and failure to work properly with industry. Government by press conference. Too much delay in releasing "white lists." Basic defects in the Amendment. Not enough time for compliance. Too much caution in respect to safety factors. Unworkable Delaney clause. Public scared when it should have been educated. Action dictated by politics.

**60% of firms lack clearance on additives**

The scores on specific problems are even more telling: No less than 60% of firms reporting do not have clearance on all additives. Of these, 62½% expect to use substitutes, only one out of three says that substitutes will be entirely satisfactory. And a third may have to stop production of an item.

A big 37½% are forced to make some change in packaging materials, with 80% of these indicating higher costs and 20% shorter shelf-life.

Reduction in sales volume is foreseen by 15% as a result of changes in additives and packages, and 52½% say that costs will be increased when all factors are considered.

Complaints and inquiries from customers as a result of the blitzkrieg publicity about additives are reported by 22½%. Sales have been hurt for 12½% and many more surmise that business has been affected.

If there be any doubt that the food industry is hard hit, in vulnerable spots, this sampling of the situation should dispel that doubt.

Now what do executives think should be done to ease the blow? Most frequently expressed request is "more time." Next comes "amend or remove the Delaney clause." Third, FDA should solve additives problems by working more closely with users. Other suggestions are: FDA should clarify its rules and policies, and contradictory rulings by FDA and USDA should be eliminated.

Another desire is that toxicity test data be made available to all after one year in FDA's "secret" file. And it is suggested that insecticide tolerances be made the same for processed as for fresh foods; also that tolerances be on a dry solids basis so as not to discriminate against dehydrated foods.

**Case of the frustrated technologist**

Technologists are even more sharp in their criticism than executives, perhaps because they are more directly involved with additives. Here's a case in point: A consulting technologist conducted two-year rat-feeding toxicity tests at the suggestion of a technical authority in FDA. After spending $150,000 of his client's money, he took proof of safety back to FDA. Then another authority ruled that the additive would deceive consumers by extending shelf-life.

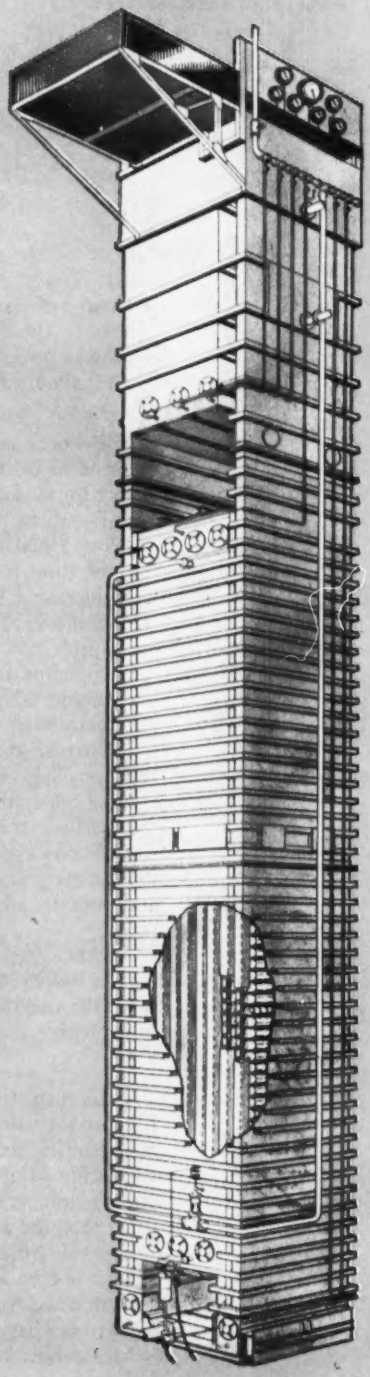
Says this frustrated Ph.D.: "Some ground rules are badly needed. Tolerances should not be so ridiculously minute. The additives situation is a critically serious mess. And the food industry must organize to do something about it."

Anyone disagree?

Meanwhile, the industry better take a forceful hand in color legislation. Otherwise, an existing mess may be topped off with another mess.

# Now, from France, for your plant and profits

# . . . a sensational (and proved) saving step in canning!



For a long time, continuous pressure cooking and cooling presented many problems in mechanics and heat exchange. *But now, a revolution from France!* Introduced just a few years ago, the genuine CARVALLO hydrostatic continuous cooker and cooler has been constantly tested, refined and improved. Today, it is considered the finest unit in the world, matching your own product quality standards.

**Only the genuine CARVALLO hydrostatic pressure cooker-cooler gives you these exclusive features...**

1. **Preheating and Cooling under Integral Counter Flow** saves up to 80% in steam and cooling water.
2. **Fully Automatic Self-controlled Unit,** directly coupled to seamers and labelers or casers, saves 100% in processing labor.
3. **Specially Designed Chains** are rugged, durable. Do not stretch or wear. The end of the carriers are closed by the chains, preventing jamming and lateral friction and damage to the cans and jars.
4. **Hydrostatic Controlled Pressure** insures an absolutely constant temperature during sterilization, eliminates transfer valves and all their troubles. Pressure variations inside and outside of cans are progressive! No exploded peas! No clouded juices! No leaking seams!
5. **Tubular Carriers Unattached to the Conveying Chains** — the same unit can process, without any change parts, cans, jars or bottles in a wide range of sizes and shapes. No jamming through dented cans or broken jars. Easy automatic loading and unloading. Carriers can be removed very quickly for yearly inspection.

*Air mail or cable...*

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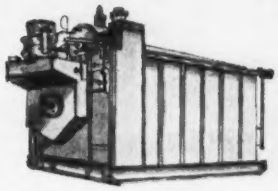
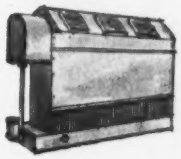
# Now... **new acid cleaners**



Steam Boilers, Condensers, Heat Exchangers, Piping



Air Conditioning Cooling Towers, Ice-Making Machines, Evaporating Condensers

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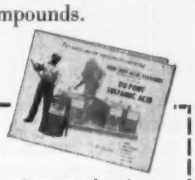
# in **dry** easy-to-handle form

**Cleaners based on Du Pont Sulfamic Acid are safer, more convenient, non-fuming... dissolve in water to form effective, low-corrosive solutions**

Now... acid cleaners you handle *dry!* No fumes or hazardous liquid spillage to worry about. When mixed with water, these cleaners have all the penetrating power of hydrochloric acid with far less corrosive effect. The key to these unusual properties is a remarkable new ingredient — Du Pont Sulfamic Acid.

Sulfamic acid-based cleaners remove scale and deposits from air conditioning and ice-making equipment; food-processing vessels; steam boilers; milk evaporators and pasteurizers; marine evaporators and heat exchangers. Cleaning action is fast, thorough. Downtime is eliminated in many cases because cleaners are added while equipment is in operation.

We'll gladly send you additional information on sulfamic acid-based cleaners and the names of formulators who offer these new compounds. Just mail the coupon below.



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Please send me ☐ sulfamic acid general equipment cleaning bulletin; ☐ names of formulators offering cleaners based on sulfamic acid.

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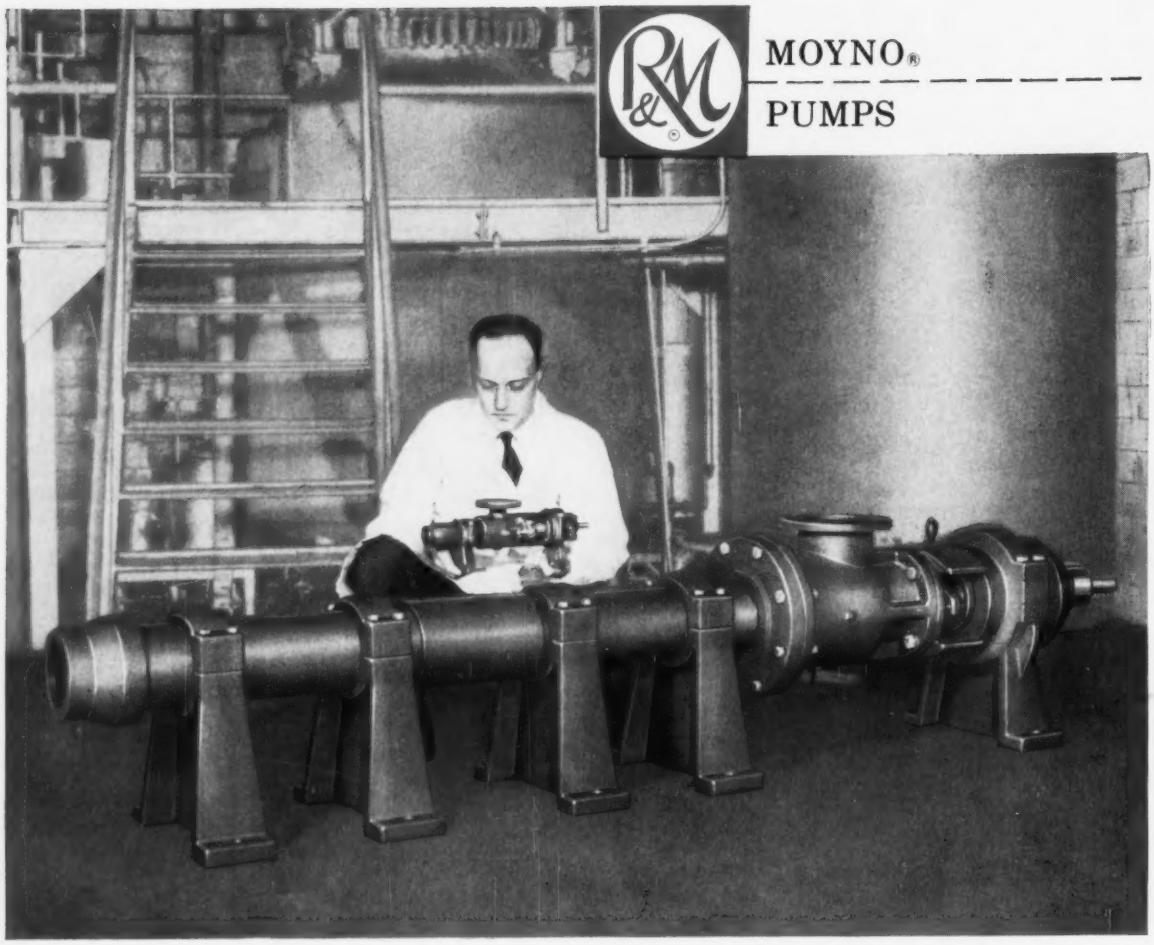

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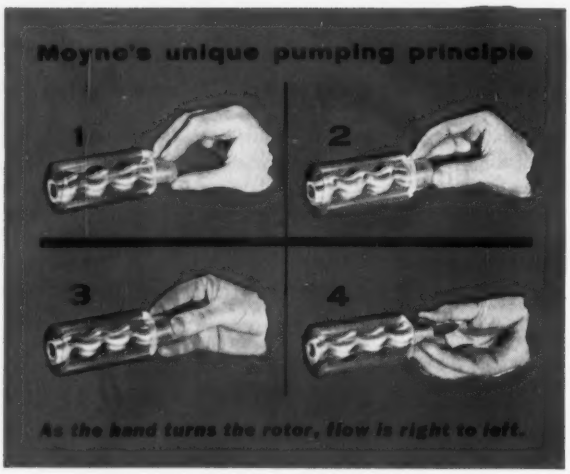
PUMPS

# MOYNO® PUMPS *capacities: from 1/100 to 500 gpm pressures: up to 1000 psi*

MOYNO pumps are available in nine sizes with capacities ranging from minimum metering flow to 500 gpm and pressures from zero to 1000 psi. Positive displacement delivers uniform discharge without pulsation, agitation or turbulence. Solutions ranging from thin watery slurry to extremely viscous paste, corrosives, abrasives and even solids in suspension are economically handled without excessive pump wear.

MOYNO'S unique *"progressing cavity"* principle with only one moving part and special resistant internal parts slashes pump maintenance costs on problem materials that often ruin other pumps. Almost any substance that can be forced through a pipe can be pumped by a MOYNO.

To learn how a MOYNO can cut your pumping costs, write today for Bulletin **30-FE**




**ROBBINS & MYERS, INC.**

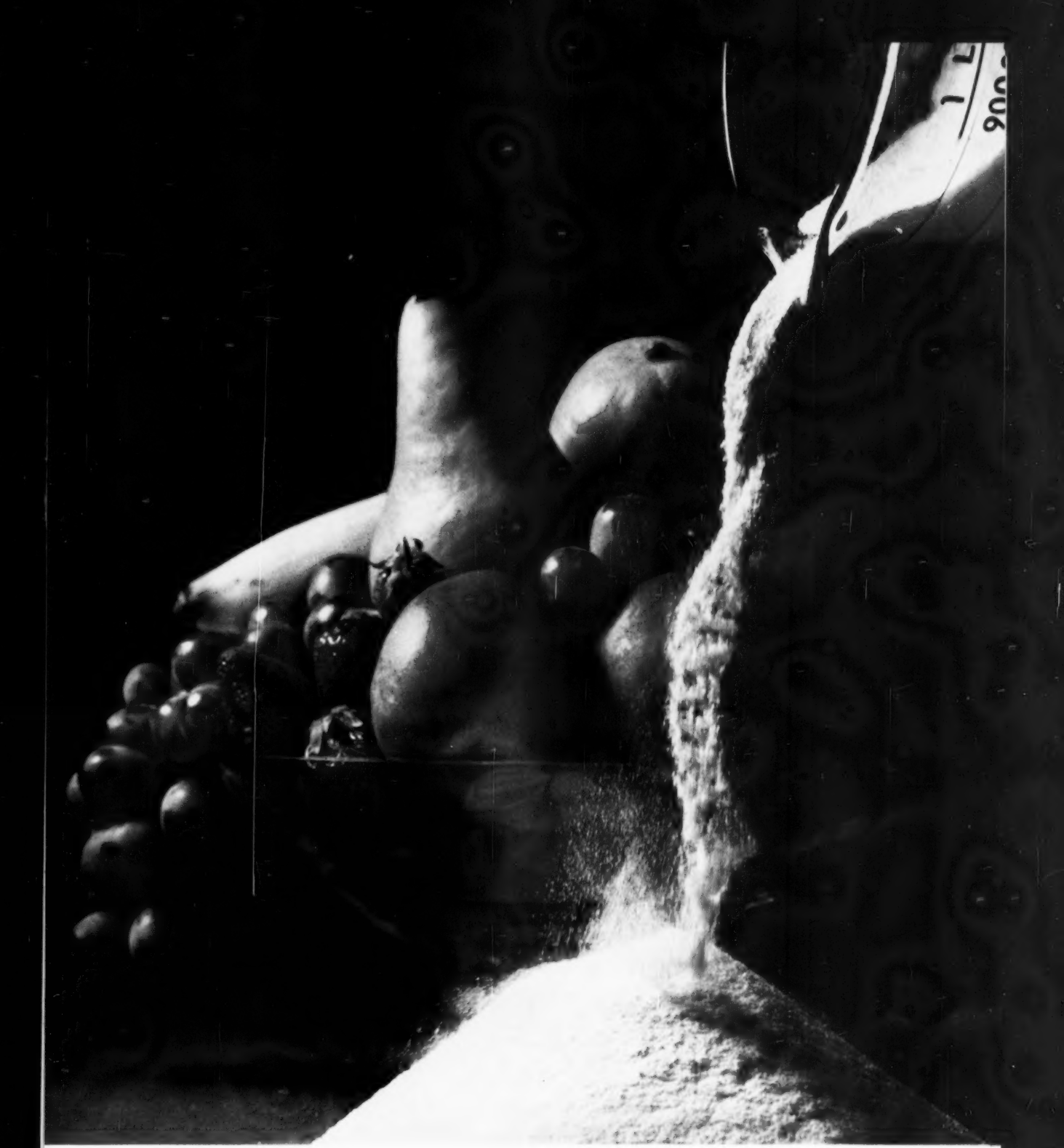
*motors, household fans, Propellair industrial fans, hoists, Moyno industrial pumps*

SPRINGFIELD, OHIO • BRANTFORD, ONTARIO



CIRCLE 34 ON READER SERVICE CARD

CIRCLE 35 ON READER SERVICE CARD→



**NEW LIFT... LONGER LIFE FOR YOUR PRODUCTS WITH FIRMENICH POWDERED FLAVORS**

New and improved techniques of process drying, exclusively employed by Firmenich, yield powdered flavors that flow freely, are dust free, and give you the finest precision in flavoring your products. These important developments in quality flavoring will improve the taste appeal of your products . . . extend their shelf life . . . give them package-to-package uniformity that captures customer preference. Samples of Firmenich Powdered Flavors, with technical information on their practical application, on request.

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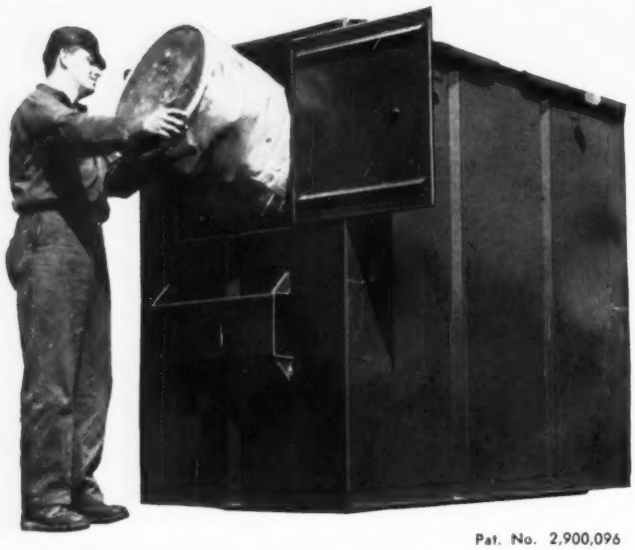
GENEVA PARIS LONDON

# How our small plant solved its waste disposal problem WITHOUT CAPITAL OUTLAY....



Pat. No. 2,900,096

## DEMPSTER-DUMPMASTER Equipped Hauler Provides Containers and Service for Small Fee

Our small Midwestern manufacturing firm did not generate enough refuse to justify ownership of its own refuse disposal system. Yet, it was plagued by unsightly trash piles, fire hazards and scattered refuse in the plant yard.

Our plant engineer then heard of a DEMPSTER-DUMPMASTER equipped private hauler in the adjoining city. A survey revealed that two big-capacity refuse containers, placed one at each end of the plant, would handle the entire refuse accumulation.

The private hauler placed the containers, and a small monthly fee covered maintenance, labor, hauling and dumping refuse. No capital outlay was involved, disposal costs were reduced, and plant housekeeping was vastly improved.

In all major cities, private haulers who own DEMPSTER-DUMPMASTER equipment render fast, efficient, low-cost refuse storage and collection service. They place one or 100 containers at your service for a reasonable fee. A free brochure describes their service in detail.

Free Brochure and Name of Nearest Private Hauler on Request

**Dept. FE-3 DEMPSTER BROTHERS Knoxville 17, Tenn. Inc.**

IN ALL LEADING CITIES FROM COAST TO COAST

DEMPSTER-DUMPSTER

DEMPSTER-DUMPMASTER

DEMPSTER COMPACTION TRAILER

**DEMPSTER DUMPMASTER®**

**EQUIPPED PRIVATE HAULERS**

**Pointed data . . .**

**. . . that aids better market planning . . .**

**. . . pays-off here.**

FOOD ENGINEERING

# How to Build Facts Into Profits

**FE survey—first ever made of market research in food-beverage industry—reveals how fact-finding is organized for better strategic planning, how much is spent on it, what management must do to maximize the benefits**

SURER DECISION-MAKING—by forearming with more facts—separates the "quick" from the "dead" in today's tough competition.

And to make sure the ammunition is there when needed, pacesetting firms are upgrading their data-probing into formal market research departments.

Of course, everyone does some kind of MR—a peek at your sales orders, for example, suggests where your business is going.

But the big difference today is the compelling need to put MR on the same scientific basis that makes production research invaluable. That's because marketing is so much more complex today—made so by shifting consumer tastes, changes in the relative importance of population components, family mobility that cancels and creates markets almost overnight, emphasis on new product development and diversification, and the unending rise in marketing costs.

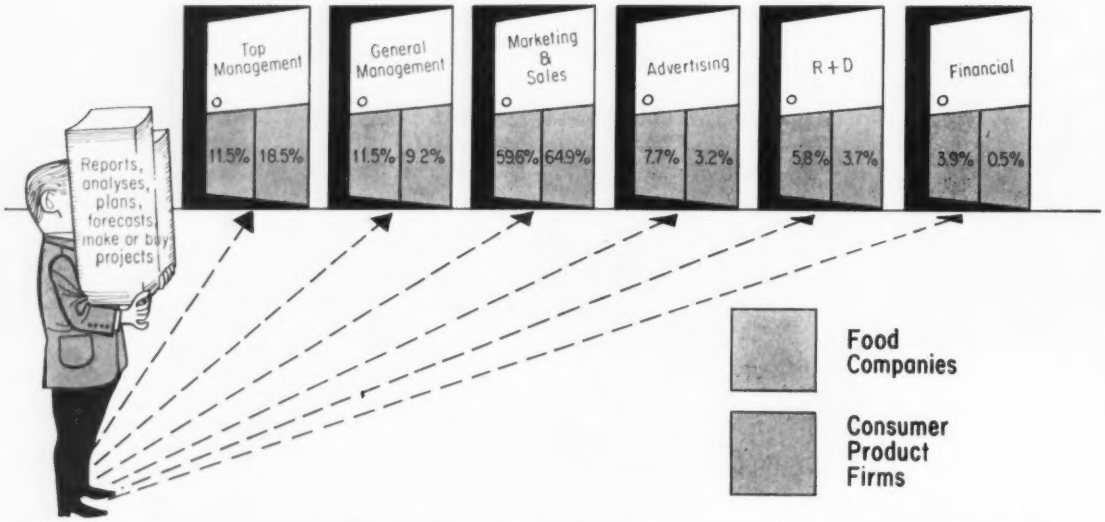
To find out how food companies are making better use of their market intelligence, FE editors have spent several months interviewing leading marketing executives. What they turned up provides shrewd insight into what you can do to make MR a low-cost premium for a valuable insurance policy—namely, profitable growth.

**Two key trends stand out among the companies' replies—(1) MR is applied to a pretty broad range of operating functions, and (2) it's put under the wing of top management in a substantial number of food firms.**

**These two striking developments reflect the stepped-up search for scientific marketing data that's been spurred by the need to offset tightening competition, reduce the risks (and costs) of marketing misplays, replace personal opinion with objective facts in decision-making, and put**

**THAYER C. TAYLOR**
Associate Editor, "Food Engineering"

## Whom the Market Research Head Reports to . . .




**HIGH-LEVEL IMPORTANCE of market fact-finding in food-beverage industry today is shown by fact that one out of five firms group that activity directly under the wing of top management. Comparative newness of organized market research in food field is shown by more diverse lines of reporting authority as compared with consumer product outfits in general (that were surveyed by American Marketing Assn.).**

**greater stress upon long-range planning for future growth.**

Of course, not all companies are convinced that market fact-finding is for them.

Such as one southern firm that said: "Our research is carried on in a hit-or-miss manner by the Sales Dept. When we want to know how a certain product—say a new item—will go in a given area, we ship 30 cartons to the broker. If it sells, good; if it dosen't, we've spent only $100. That's still a better, and more economical, way to be sure of consumer preferences than paying 'marketing experts' to count cans in Seattle."

### Basic Isn't Enough

While this no-frills approach has its supporters, there's evidence aplenty that more and more food firms want something more sophisticated than mere head-counting. As witness this definition, by a leading beverage concern, of MR's primary function: "To obtain and distribute facts which will assist all departments within the company to perform their functions more efficiently, thus resulting in greater sales and profits."

Certainly, the organized track-down of marketing data has accelerated in every decade since the turn of the century—to reach a dizzying pace in the '50s. Among the FE-checked firms with formal MR departments, 10% had taken the step during the '30s, 20% in the '40s, and 66% in the '50s.

Even more significant is the rate of department formation that took place in the last 5 yr.—when the number of installations almost doubled that of the decade's first half. Behind this accelerated tempo, obviously, were the challenges of socio-economic changes and their impact on eating habits, as well as the transition from production-centered to consumer-oriented operations. And with these challenges has come the need for more pointed fact-finding.

Along with the impressive growth has been a varied approach to market sleuthing. You get a good picture of this diversity when you study how food companies are structuring MR on their organization charts and how they are putting it to effective use.

### Top-Side Interest

Although formal MR is of comparative recent vintage in the food industry, a noteworthy percentage of companies consider it important enough to have the MR director answer directly to the highest company echelons. In fact, in 11.5% of the firms checked by FE, he reports straight to top management—the president, board chairman, or executive vice-president. In another 11.5%, his line of authority runs to the second level—assistant to the president, general manager, or vice-president.

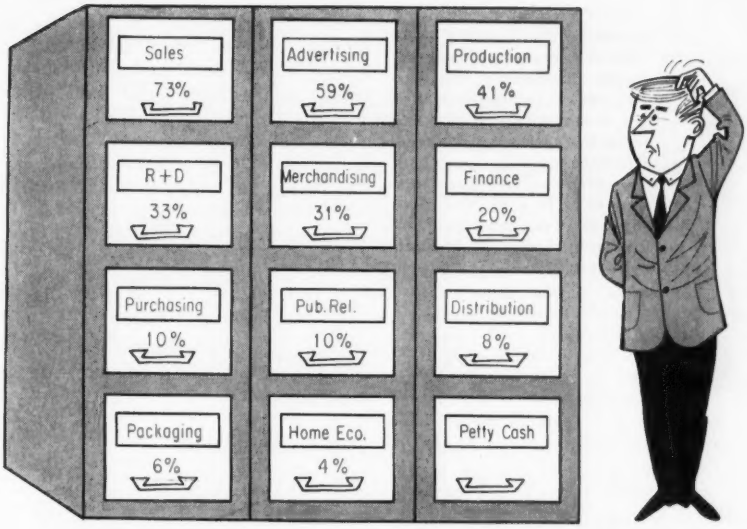
It's worthwhile noting how this pattern compares with consumer product industries in general. A '59 study by American Marketing Assn. ("A Survey of Marketing Research") found that among 185 consumer product firms, the MR director answered to the top level in 18.5% of the companies, to the second level in 9.2%.

This 27.7% total is somewhat greater than the 23.0% turned up by FE. However, it must be remembered that AMA's broader poll included the household item, drug, and soap fields, where a sharpened degree of research-mindedness probably took hold earlier than in the food-beverage area.

**Nevertheless, the fact that more than one out of five food firms position MR under the wing of top management points to the high-level importance already attached to this kind of research and indicates further growth for it in the years ahead.**

Considering its close relationship to selling techniques, it's no surprise

## . . . And Whom He Works With




**MARKETING INTELLIGENCE is broadly applied to all areas of the business. For example, market research maintains "close liaison" with sales in 73% of the firms checked by FE, with production in 41%, and with finance in 20%. Helping out here are faster fact-tracking methods.**

that a preponderant majority of food firms (59.6%) organize their MR under sales or marketing management. This compares with 64.9% of the consumer product companies that have a similar setup (according to AMA's survey).

When you move into the other operating areas, MR's broader role in the food field shapes up vividly. For example, in 5.8% of the firms, the MR head reports to the R&D director (vs. only 3.7% in AMA's check), in 7.7% to advertising and "other sales" management (vs. 3.2%), and in 3.9% to the financial officer (vs. 0.5%).

What's behind the link with R&D is apparent—to coordinate all research under one line executive. But the degree of financial tie-ins contains obvious as well as more subtle factors.

For one thing, MR often started as economic analysis (headed by controller or treasurer) and continued the relationship when put to broader uses. Then, too, much of today's fact-finding aims at forecasting—where tomorrow's markets will be, how sales will stack up. Naturally, such data weigh heavily when it comes to planning new plant locations, estimating borrowing needs, or drafting budget estimates for 5-yr. plans.

And with marketing expenditures biting off bigger chunks of the operating budget each year, MR comes in for more use as a control tool for evaluating these outlays. Which may also explain why some 23% of the companies have it report directly to top management.

### Why the Difference?

You get a wide gamut of reasons as to why the MR head answers to the president in one company, to the marketing manager in a second one, and to the treasurer in a third.

A seasoned industry observer feels this variety is due to a lack of standardized practices. As he sees it, formal MR departments aren't always logically set up at first, since management may not know what it expects from the venture. Where the department ultimately fits in, he contends, depends upon how the MR director fills the job.

One pacesetting firm splits the line of authority so that the chief executive rules on policy matters, the administrative v.-p. on other aspects. In a packaged goods concern the president gets the research reports "so as to encourage maximum objectivity and free MR from ties to any operating department." Taking the same tack, a beverage outfit has the assistant to the president oversee the MR work "to maintain the impartiality of the research function, and funnel the information directly to top management."

A confectioner routes MR to the executive v.-p. because "he is the man with complete active control of all operations—the sales v.-p. reports to him." A brewer with the same arrangement says it's because "he's our chief administrative officer with final authority on all activities."

In the three out of five firms where the MR director is under the marketing officer, these explanations are given:

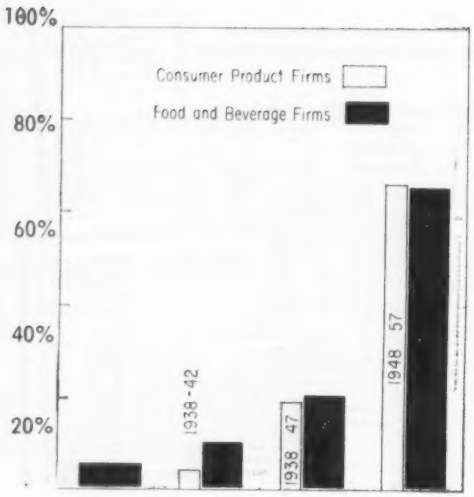
Brewer: "Marketing v.-p. is responsible for sales, advertising, promotion, research, and related market functions." . . . Dairy: "He's in charge of developing market strategy." . . . Produce: "Coordinates all marketing functions, and MR is the fact-finding body for those areas." . . . Candy: "Marketing director is a company-oriented executive, and the nature of current research deals with marketing problems." . . . Baker: "Marketing manager is logical supporting head, for he coordinates all advertising, marketing, promotion, and research in the fulfillment of long- and short-range plans and goals."

Companies that make MR answerable to the sales executive cite these factors:

Seafoods: "He can best apply what's learned on trends and forecasts." . . . Canner: "Responsible for sales success." . . . Specialty items: "Performs sales and market research duties." . . . Meat packer: "He receives requests for research projects from the product managers."

Some outfits, of course, position MR on their organization charts in line with specific internal factors. A West Coast concern deploys market scouting under the vice-president-operational services "because it connotes having proper supplies available for manufacturing operations and the movement and storage of finished products. These functions are handled by the Purchasing Dept. using the plan of operations developed by the Planning & Statistical Dept."

A candy maker's MR Dept. is under the merchandising director "because he heads all staff functions in the sales area." And a brewer's counterpart reports to the research direc-




**TWO-THIRDS of food firms polled by FE installed their market research departments during the last decade, because of greater need for scientific data to keep up with marketing changes. One-fifth of the firms took the step during the '40s, one-tenth in the '30s. Data for consumer product firms are from American Marketing Assn.**

tor so as "to coordinate all research and sales analysis."

## Touching All Bases

A second revealing trend revealed by FE's survey is the wide-scale application of market intelligence in various company operations.

Here, 73% of respondents said MR maintained "active liaison" with sales, 59% with advertising, and 31% with merchandising.

However, more than two out of five firms (41%) said the market factfinders worked closely with production, 33% with R&D, and 20% with finance. And, to give you an idea of MR's extended reach, 10% cited public relations, 10% purchasing, 8% distribution, 6% packaging, and 4% such service areas as home economics.

**This broad-scale contact with corporate functions, observes the National Industrial Conference Board in a survey of industrial research, makes MR an effective training ground for future executives. If such is the case, this should make tomorrow's management even more MR-minded than today's line officers.**

In a sense, this wide-ranging contact with all areas of the business mirrors management policy to have operating problems viewed from an over-all company, rather than departmental, angle. NICB also noted, in this respect, that high-speed data processing machines enable MR to probe a greater variety of functional areas. It's also been noted that the more departments MR works with, the readier its access to the kind of data needed for objective analysis.

Toting up what the companies describe as their "major areas of MR activity" gives you a rough idea of where today's data hunt is centered. Admittedly, any grouping of subject areas is a rough one at best.

For purposes of comparison, replies were classified under these headings: Performance checks, products & packages, sales, markets, consumer, and advertising.

With the premium placed on new items in today's battle for shelf space, it's not unusual to find product research high on the list. Some 66% of the firms said their market sleuthing was aimed in this direction.

New product development is being pushed by 24% of the firms, and product testing by 16%. Package research, a related area, was stressed by 14%. Other targets: Market testing of new items, market studies by product line, product innovations, and over-all product and package checks.

A spokesman for A. C. Nielsen Co. noted that food companies have stepped up their requests for new product information. He said it was evidence of management's aim to go about new product development in a more scientific manner in an effort to reduce both the costs of failure and the high mortality rate among new items.

Improvement of internal operations is targeted by a considerable amount of MR work, too. More than half (56%) of the companies use MR as a performance check.

A good part of this work pivots around sales performance—with sales analysis specified by 26% of the firms, sales control or planning by another 10%.

Better, low-cost distribution is emphasized by 6% of the firms, and more productive store displays by 2%. Efforts to upgrade operational efficiency are also evident in MR's use to improve production scheduling, planning of branch and plant locations, and evaluating of work of public relations departments.

A third key target area is advertising—with 26% of the firms concentrating on better evaluation of advertising effectiveness in regard to choice and cost of media, selection of audience.

Selling and marketing programs are the MR focus in 36% of the firms.

Consumer and market studies get the nod by more than one-fourth of food firms.

## The Facts, Ma'm

What the companies consider to be "the primary function of MR" underscored the broad sweep of the industry's factfinding.

Improving marketing efficiency was cited most often (24%) as the main objective. For a meat packer, this means "keeping abreast of needed changes in products, packages, and markets." While a packaged goods concern views it as "assuring efficient spending of marketing budgets."

A brewer uses MR primarily to "channel marketing efforts along the most productive lines, including direction to those areas of greatest potential, new packaging opportunities, and evaluation of performance in all areas."

Next in the prime order of importance were (1) providing usable facts to operating management, (2) market analyses, and (3) new product development—each of which was cited by some two out of five firms.

How the results of all this intelligence work are being used is illustrated by the following comments:

"Providing factual information as the basis for management decisions." . . . "Supply facts to management in place of guesswork judgment." . . . "Enable executives to make more accurate, intelligent decisions." . . . "Replace the personal decision approach; try to project tentative decisions into probable sales results." . . . "Act as fact-finding body for general management, and for all functions of the marketing department." . . . "Achieve facts from primary and secondary sources in and out of the company to guide executive planning."

Although the marketing intelligence network is churning out more and more meaningful facts today, financial support is still a very small item on the company operating sheet (less than 1%). This is traced to a number of factors—namely, management concentration on technical research up to now, fledgling status of organized MR, and the allocating of some marketing fact-finding expenses to other departments (such as sales or advertising).

## Done on a Shoestring

**Approximately half of the FE-checked firms revealed the percentage of gross sales budgeted for MR. Of those, the average was 0.287% of sales.**

In general, percentage declined as company volume increased. Where annual dollar volume was $20 million or less, MR's budget came to 0.132% of sales. This share moved up to 0.413% for firms in the $21M-$100M range, but dropped thereafter. Firms in the $101M-$500M category budgeted MR at 0.345% of sales, while those in the over-$500M class invested 0.025% of sales.

The spread was pretty considerable. The biggest percentage cited was 2.0%, the lowest 0.0004%.

By and large, this is a pretty impressive showing compared to consumer products outfits as a whole. The above-mentioned AMA survey showed that such concerns put their MR on even leaner diets—0.18% of sales for companies in the under-$25M category, 0.17% in the $26M-$100M class, and 0.085% in the over-$100M group.

It's also noteworthy that a '59 report by American Management Assn. placed MR expenditures at 0.2% of volume for consumer product outfits.

Where food companies declined to give budget data, the reasons stated pointed to the swaddling-clothes stage of formal MR in the industry. For example, while 10% of the decliners said the data was "confidential," some one-third admitted they lacked a reliable estimate. At least two out of five shrugged it off as "very minor" or "less than 1%."

MR's flexible stature in the industry was underscored by the acknowledgment by some 23% of the firms that they operate without a fixed budget. Here, the reasoning went, money is allocated as the need turns up, or funds are charged against another department. Others said they avoid fixed budgets because much of the fact-finding gets its start from unforeseen problems.

### Food Spurts Past Non-Food in MR Outlays

| Food & Beverage Firms | | Consumer Products Firms | |
|---|---|---|---|
| Class by Sales Vol. ($ Million) | % of Gross Spent on MR | Class by Sales Vol. ($ Million) | % of Gross Spent on MR |
| 0–$20 | 0.312 | 0–$25 | 0.180 |
| $21–$100 | 0.413 | $26–$100 | 0.170 |
| $101–$500 | 0.345 | $100–plus | 0.085 |
| $500–plus | 0.025 | ..... | ..... |

**Data turned up in FE's probe indicate that food firms are more market research-minded than consumer products industries polled by American Marketing Assn. Further evidence: Average for all reporting food companies was 0.287% vs. 0.200% spent by consumer item outfits checked by American Management Assn. recently. Greater emphasis in food field reflects stepped-up new product programs, drive to lift thin profit margins, and broader application of data findings to all corners of the business.**

## More Facts Per Buck

What can management do to get more for its MR dollar?

The most popular prescription (by 27% of the firms) was greater realization of the contribution market fact-finding can make to management decision-making. The next two favorite suggestions were (1) complete open-mindedness to research results and (2) increased awareness of MR's importance in company operations.

A West Coast company's cure: "Management must (1) realize that MR doesn't provide all the answers, but is an aid to management decisions; (2) permit it to be done in an atmosphere where sales, production, finance, or ther divisions don't exert undue influence on findings or conclusions; (3) have an awareness of the limitations of MR in answering problems, *i.* e., that it deals in probabilities; and (4) understand that not all questions are 'researchable' and does not condemn MR because of it."

A specialty products outfit asked for "recognition of the potential usefulness of MR and management's willingness to consider its recommendations." At the same time, the company warned, MR "must avoid any feeling of competition with other departments, and should instill a feeling of cooperation."

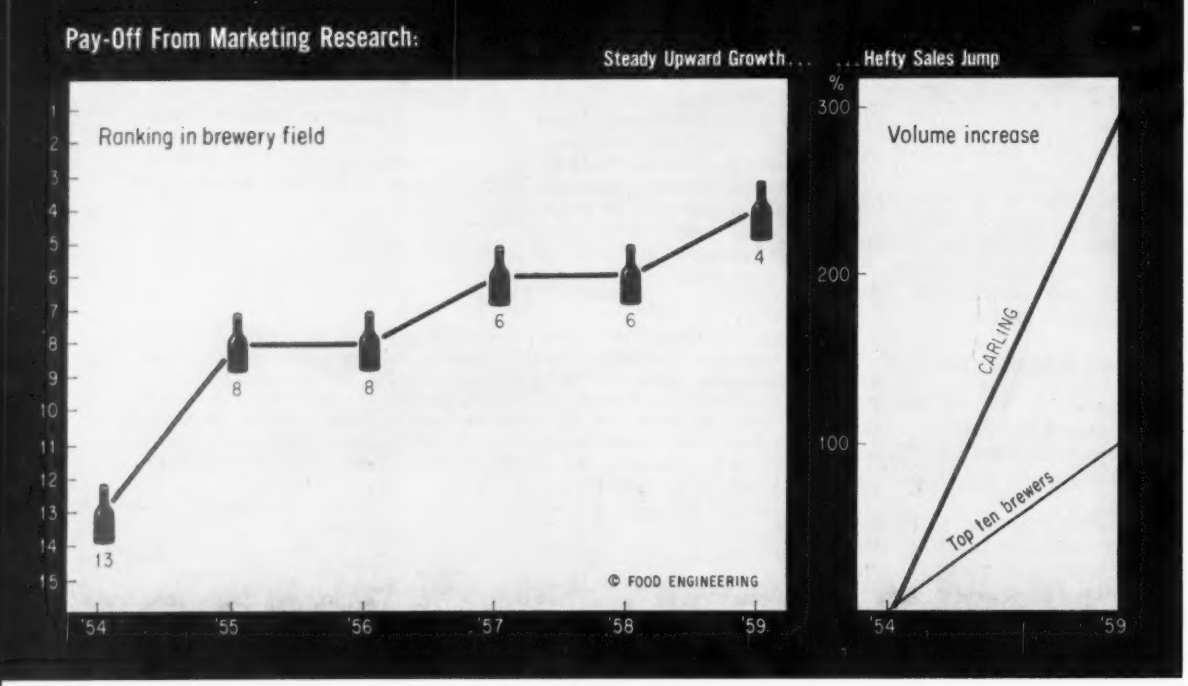
A dairy company criticized "evaluation of the money-saving approach." "The MR head should be an active member of the marketing team," a produce firm opined.

An open-minded management that "can take a critical report and be appreciative of the information" was a baker's prerequisite. While a confectionery concern, sounding a similar note, asked for management's "willingness to go along with change when change is called for."

Other recommendations included these: "Orientation of staff executives toward information provided as the result of objective analysis." . . . "Let MR enter into original discussion on research needs." . . . "Be sure that MR has adequate background knowledge of a problem so that research objective can be practically directed." . . . "Ability to listen without preconceived seat-of-pants fixations." . . . "Willingness to invest heavily in experimental research to develop more useful techniques than we now have."

Closer liaison between top management and the MR Dept. was urged by 16% of the firms. This meant having the director participate in defining research needs, calling him in when policy was being planned, keeping him abreast of management problems so he can start research projects on his own initiative, and positioning him at a top-executive level. —*End*

Appreciation is expressed to Du Pont Co. for photos on cover and right side of page 37, to Oscar Mayer Co. for center photo on page 37.




**MOVING FAST since 1954, when it was 13th, Carling has climbed to 4th position on the brewery ladder. During same period, company's gallonage zoomed 295%, while output of 10 leading brewers gained only 129%.**

*MARKETING*

# Carling Climbs Fast

**Planned fact-finding arms management for better decision-making that rockets brewery to top rank. . . . Case history of critical package change shows how probing exposes potential hazards**

**RALPH I. ALLISON**
Director of Marketing Research
Carling Brewing Co., Cleveland

IT WAS NO ACCIDENT—Carling's jump from the 62d spot in the beer field to 4th in 10 yr. It was *planned* that way!

**And a key element in the planning has been our marketing research program—designed to take out the gamble by getting facts on which better marketing decisions can be made.**

But this fact-finding hasn't always been easy, as this recent example shows—

The problem: Would we lose sales if we sold our Red Cap Ale in brown instead of the traditional green-for-ale bottles? Reason for projecting this change was to get the product quality protection afforded by the amber glass.

Using both the green-for-ale and brown-for-beer bottles meant bigger inventory problems, higher sorting costs, and numerous production inefficiencies during filling and labeling. With us, the problem became more serious as we added more breweries (we now have six in all). Also, the two bottle colors meant less efficient purchasing and production scheduling.

## Beware the Obvious

Why does solving such a problem sound easy? At first thought, all the researchers need do is ask ale drinkers if they prefer green or brown bottles. But it doesn't work out that way.

It's deeper than merely asking consumers their bottle-color preference. Most people are unaware of the subtle effects such things as bottle colors have on their attitudes and likes. Moreover, people tend to favor that to which they have become accustomed.

In this particular case, we called in a professional marketing research organization—Market Facts, Inc., Chicago—which specializes in problems of this type.

Here is how Carling and Market Facts went about getting facts on which management could base its decision.

First, brown bottles of various sizes replaced green ones in a specific distributor area having a population of approximately 360,000. No advertising or promotional activities of any nature took place.

An examination of sales results after testing for 6 months indicated that this product could be successfully sold in brown bottles. Furthermore, the brown bottle was highly

**The Tools . . .** **. . . and Results→**

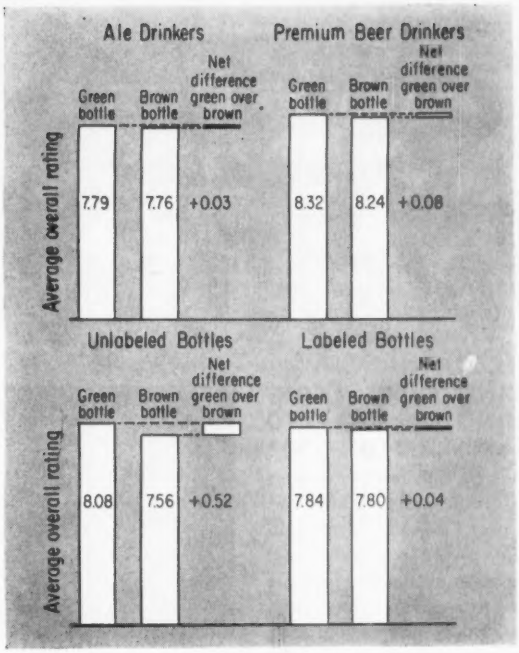
**BOTTLE COLLARS asked pre-screened ale drinkers to rate ale's taste appeal on scale that had 11 index boxes between "Excellent" and "Very Poor."**

Rate this six-pack for each of these characteristics:

(Check One Box Across for Each Characteristic)

| | Excellent | Good | Fair | Neither Good nor Bad | Poor | Very Poor | Objectionable |
|---|---|---|---|---|---|---|---|
| Taste or flavor | | | | | | | |
| After taste | | | | | | | |
| Sweetness | | | | | | | |
| Carbonation | | | | | | | |
| Alcohol content | | | | | | | |

**COMPREHENSIVE QUESTIONNAIRE, that had samplers evaluate 6-pack as a whole rather than individual bottles, included this rate chart for certain key points.**




**CHECK WITH labeled bottles showed that glass color didn't affect the level of product acceptance among either ale or beer drinkers. Green bottle did have slight edge when unlabeled samples were used. But this margin disappeared when labeled bottles were employed.**

# —By Outflanking Market Risks

acceptable to retailers and wholesalers because of greater product quality protection and elimination of the irksome task of sorting empty bottles by color. The brown ale bottle was interchangeable with all existing brown beer bottles.

Second, we chose a study plan whereby ale in brown bottles was tested for consumer acceptance on a small and carefully controlled scale.

A probability sample of ale drinkers—pre-screened so that we tested only drinkers of our Red Cap product and one specific competitive brand—was selected in several markets. Users of both ales were chosen so that comparisons could be made.

Test 6-packs were prepared. Half of the 6-packs held ale in green bottles, half in brown. In turn, half of each color bore the usual label while the rest were unlabeled.

The ale-drinking sample was divided into four groups. Group No. 1 received unlabeled green bottles of ale; Group No. 2, unlabeled brown; Group No. 3, labeled green; and Group No. 4, labeled brown.

At the end of the first week, customers were asked to rate the 6-pack in terms of taste appeal. Each drinker recorded his reactions to the product in terms of specific likes and dislikes as well as overall attitudes. No mention was made of any interest in bottle color.

For the second, third, and fourth weeks, each drinker received a duplicate of the test pack he received for the first week. However, it was implied that one or more of the test 6-packs given each week was a product or formula different from the first.

The same recording of likes and dislikes was followed for each test pack.

**Thus, the ale-drinkers were testing bottle color only, although they assumed they were testing differing brews. In this way the real image and taste appeal of the bottle color was being measured without their knowledge.**

The tests's results, shown above, revealed that there was no significant difference in preference of the green bottle over the brown. Remember, the brews were identical and the only difference in the test packs was in bottle color and in label or nonlabel.

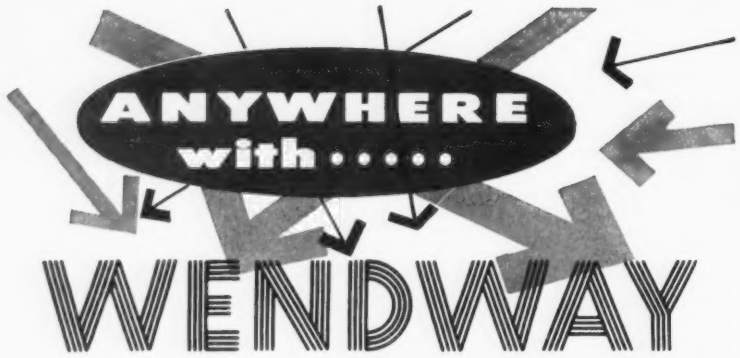
The reason that half the bottles were labeled and the other half not was to make sure that the results of the test would not be distorted because of a "known" or "unknown" label.

**In this study, reactions of heavy ale drinkers as compared with light drinkers were checked. This aspect was important because one-third of all ale drinkers account for about three-fourths of total ale consumption.**

In this test, however, the attitudes of the heavy drinkers were similar to those of the light drinkers.

As a result, we decided to use brown bottles and thus reduce production costs. More important, Carling has maintained its share of market in those areas where the change has already taken place.

Was all this elaborate testing necessary? What would have hap-




**CLEANER, QUICKER CONVEYING OF WRAPPED OR UNWRAPPED FOODS**

Wendway efficiently conveys food products of any kind . . . up, over, down and around to any point in your plant. Wendway eliminates multiple handling, saves man-hours, floor space and equipment. Wendway can solve your conveying problems and make you more profits, too!

As sliced cold meats travel by on stainless steel Wendway belting, operator labels each type as they proceed to the automatic packaging machine.

Packages, cartons or boxes ride perfectly on Wendway's smooth, silent belting. Products stay clean and unhandled from one operation to the next.

Here you see sliced luncheon meats travelling from wrapping machine to bag sealing station and on to packing station. Wendway belt speeds are synchronized to desired production speed.

Where solid belt conveyors are needed, canvas, Neoprene rubber, etc., can be supplied to meet the specific requirement. Remember . . . in your plant you can go *Anywhere* with *Wendway!*

Gentlemen: Please send me complete information about the versatile Wendway Conveyor Systems for _____

Name _____

Company _____

Street _____

City _____ Zone _____ State _____

☐ Please have a Wendway engineer contact me at once.




pened if we simply asked ale drinkers which bottle color they preferred?

Market Facts did go out and ask—as a check.

And of the ale drinkers queried as to which bottle they would prefer, about two-thirds selected the green one.

**Had this test been the basis for our decision, the move to the brown bottle—and its resultant savings—would never have been made.**

This case history illustrates the infinite pains required by effective marketing research—and the pitfalls always waiting for the unwary. The "obvious" way to get the facts in this case—to ask directly about color preference—would have made us afraid of the switch because of negative consumer reaction.

Most of Carling's marketing research is carried on by our own offices. But we sometimes call upon an outside organization, as in the above instance, because very few companies maintain the complete facilities needed for all types of research problems.

## Who Sparks It?

Marketing research projects arise from a variety of internal company sources. Quite often, sales, advertising, production, and brewing departments pose particular problems that can only be solved by a variety of consumer research techniques.

Most of these research projects require discussions of the research objectives with the different departments concerned. The research proposal is submitted to Marketing V.-P. A. R. Mertens for his review and approval before actual field work begins.

**Perhaps the most rewarding phase of the research operation at Carling is the rapidity with which management makes a major decision based upon a particular research project.**

For example, extensive "blind" product consumer taste tests were done in the Pacific Northwest after the purchase of Heidelberg Brewing.

Competitive brands were evaluated and also several "start up" brews of our Black Label Beer produced in Tacoma. Purposes of these tests were to insure uniformity of the product quality with other Carling plants and also to insure complete consumer taste acceptance.

The above examples merely give some indication of what can be accomplished in the reduction of marketing risks through planned marketing research activities. —*End*

## No Strike-Pinch for Quick-Fix

How did convenience foods fare during the recent 116-day steel strike? Pretty well, according to an FE check of leading marketers.

Libby, McNeill & Libby reports that "in the heavy steel producing areas (Pittsburgh, Youngstown, Chicago) there was a decline in dollar sales but not necessarily in tonnage." Echoing this, a General Foods official notes "a slight dip in the big steel areas, but it wasn't significant."

The comparatively low cost of heat-and-eat items is stressed by General Mills. Says that firm: "Other things will give ground first, as most of our products are relatively inexpensive. If any food at all were to decline, it would probably be the more gourmet types or fresh produce." And Oriental-foods marketer Chun King declares "we made consistent sales gains as the result of aggressive promotion."

Two factors behind this encouraging pattern are noted in a Chicago Federal Reserve Bank study of the strike's effects on buying habits in the Gary-Hammond area. For one thing, credit by independents–and even the cash-conscious chains–was an effective prop. Also, budget-pruning bore down hardest on general merchandise–department stores sales were off 8-11½% from August through October.

## More 'Scrambled' Selling On Order

Two unrelated announcements last month point to a trend that's accelerating fast–more non-food sales in food outlets, more food sales in non-food outlets.

Grand Union this year will build 9 more Grand-Way units that sell 7,000 food and 30,000 general merchandise items under one roof. Whereas the 14 earlier Grand-Ways sold a restricted line of non-foods, the new units will have major appliances, do-it-yourself centers, furniture, and clothes for all members of the family.

Meanwhile, Montgomery Ward (second-largest mail-order house in the country) moved to counter supermarket incursions. Working with Wilson, the firm will soon offer frozen meats, poultry, and prepared meals to its mail-order customers.

## What Price Merchandising?

Food firms budget 1.99% of sales for advertising, according to *Advertising Age*. The data, compiled from Internal Revenue Service sources, cover tax returns for 1957 calendar year or fiscal years through June '58.

Beverage firms allocate 4.64% of sales to their sales wooing, the magazine reports. Also, canners devote 2.65%; dairies, 1.89%; meat packers, 0.59%; bakers, 2.80%; candy makers, 3.58%; and cereal firms, 4.83%.

## Marketing Climate: Storm Clouds

Increasing government controls will make efficient merchandising more and more complicated in the Sixties, warns H. Thomas Austern, chief counsel, National Canners Assn. Addressing the American Marketing Assn.'s N. Y. Chapter last month, he said marketers can expect more Federal intervention in these three critical areas–(1) what and how you make it, (2) how you price it, and (3) what you can say about it.

He said that developing trends toward "control by administrative order . . . and trial by press release" will be felt, especially in the pricing and promotion areas. And, he continued, FTC's stepped-up interest in TV commercials poses "further ramifications of more government intervention in marketing activities."

## How Effective Is Food Advertising?

Some new light on how good a job the industry's ad dollar is doing is shed by a new USDA study. **Advertising expenditures by manufacturers, it reveals, climbed from $319.5 million in '47 to $724.0 million in '56–a 127% jump. Significantly, food consumption outlays showed a sharper rise during the same period–136% ($45.7 million to $62.2 million).**

One other trend uncovered in the survey, which bears on the growth of private labels, is the fact that retailers are fattening their ad budgets at a much faster pace. During the '47-'56 period, they upped their advertising 303%.

## BRIEFS

**Price-marking at factory level** is being tried out by Midwest margarine concern for private label chain store accounts. If successful, move could spur more retailer pressure on other manufacturers to follow suit.

**Frozen foods warehousing manual,** issued by Armour, is designed to promote storage and handling practices in line with forthcoming state regulations on frozens.

**Price wars in baby foods** have flared up in scattered Eastern markets, Gerber reports.

**Advertising and sales promotion** took 9% of Canada Dry's $25.3 million sales volume in '59 as firm pushed its "flavor for every taste" diversification program.

**Most promising opportunities in Australia** include frozen citrus concentrates and poultry meat, conclude Standford Research Institute economists after 14-mo. study of investment possibilities for American firms.

**National chain of franchised miniature supermarkets,** proposed by Convenient Food Marts, took another step forward when 12-mo. operating tryout in Chicago greatly exceeded sales and profit goals.

**Musical outdoor billboards** are being tested by Nabisco in upstate New York for "Millbrook" bread.

**National retail distribution survey** of 25,000 outlets, by Audits & Surveys Co., will give nationwide count of stores carrying a product category, a specific brand, and competitive labels.

**"Taste-maker" theory is outdated** by shopper's growing sophistication, contends Harley Earl Associates, design firm. Greater exposure to cultural influences has raised consumer appreciation of good design, company says.

# Buyer Check Bars Misplay

From files of *National Consumer Panel* and *Menu Census of Market Research Corp. of America* . . . Material is factually correct. Identities of products and companies have been masked to insure anonymity—The Editors*

**MARKETING CASE HISTORY OF MONTH**

**Management's problem**

OUR AIM is a revised package that will do a better job of boosting consumption of our semi-convenience item.

We know that the purchasers of each of our two package sizes comprise distinct buying groups. For the most part, those who buy the small size can be classified as occasional or "light" buyers, while those who primarily purchase our large size are regular or "heavy" buyers.

Our problem: What appeal shall we aim at each group? Both are important.

The light buyers account for two-thirds of our franchise but heavy buyers represent two-thirds of our volume.

We assume that heavy buyers serve the product morning, noon, and night, and that they are also the best customers for competitive "home-made" ingredients. Furthermore, we feel that the light buyers keep our small size on hand, for the infrequent occasions when they serve the product, because they do not want to spend the additional preparation time that home-made ingredients require.

If these assumptions are correct, then we should use the large-size package to sell heavy users on the product's advantages over home-made ingredients. Promotion for the small package should encourage more frequent servings.

Before going ahead with the expense of package revisions, however, we want to be certain on two counts:

1) Are our assumptions about home usage correct?

2) Are there any promotional opportunities that we may have overlooked?

## WHAT WOULD YOU DO?

**Management's decision**

First, we separated the light buyers from the heavy ones by consulting a full year's records of families in the National Consumer Panel. These households—a statistical cross-section of all U.S. families—report regularly on their purchases of selected food and household products. Next, we studied the usage habits of each group via the Menu Census, a year-long record of the food preparation and serving histories of families in the National Consumer Panel.

**The results were the direct opposite of what we had assumed! Heavy buyers did not serve the product in a variety of ways at different meals, but limited their servings to one specific meal and to weekdays.** Their high purchase volume was accounted for by their regularity of serving and the fact that they did not use home-made ingredients.

**And our light buyers were not necessarily light users.** They supplemented their employment of our product with substantial use of home-made ingredients. While they served the product less regularly than heavy buyers, they were not as limited in their choice of meals. It was as much a part of their weekend menus as their weekday bill-of-fare.

**Result of action**

Acting on this information we could now promote maximum use of each package size by stressing product convenience and quality on the small size, and varieties of serving opportunities on the large one. This was the reverse of our original plan.

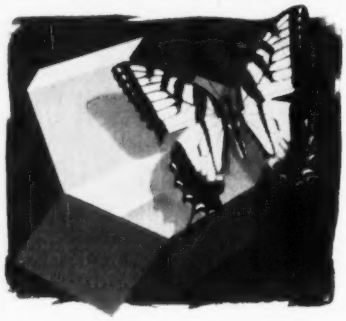
*For more information, write to FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.


*in packaging*

**Weyerhaeuser**
(Ware'-hous-er)

*is pronounced*

**Ingenuity**
(In-je-nu'-i-ti)



**If there were a popular demand for butterfly wings, Weyerhaeuser Ingenuity would package them to give you a selling advantage**

Weyerhaeuser knows packaging from the ground up—from the tender shoots of tiny saplings to the whims that ring cash registers. Weyerhaeuser boxboard plants supply quality materials with which specialists work in creating sales-building inducements to influence shoppers.

At Weyerhaeuser, knowing *what* folding carton to make is just as important as knowing how best to make it for user convenience... product protection . . . distributor and dealer approval . . . visual appeal. Working as a team, the Weyerhaeuser group welcomes packaging problems. For advanced thinking in *your* folding cartons . . . write Weyerhaeuser.

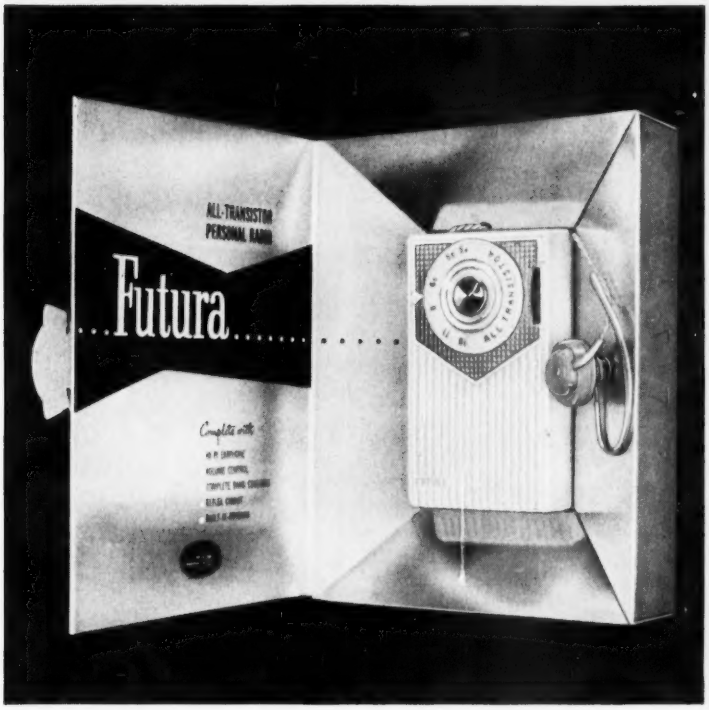
**REQUEST NEW "INGENUITY" BOOKLET**

This booklet can give you a new concept in packaging. See why working-with-Weyerhaeuser is the answer to folding cartons.

**Weyerhaeuser Company**

**Boxboard and Folding Carton Div. Headquarters**
**919 N. Michigan Ave., Chicago 11, Ill.**

## Weyerhaeuser Packaging Ingenuity at work for Bell Products




# Self-Display! Impact! Economy!

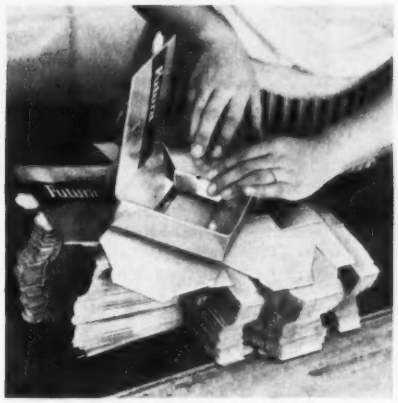
*Bell Products got them all in this novel*

# Carton by Weyerhaeuser

*THE PROBLEM.* A carton to "merchandise" miniature radios—with sufficient bulk for easy handling . . . stability at top, bottom, corners, for product protection and sustained shelf-beauty . . . striking design that invites inspection, enhances product appearance . . . economy for volume-priced sales.

*THE ANSWER.* This unusual book-type package by Weyerhaeuser that displays the radio in a gold "picture frame" setting. Inside of cover carries same selling copy as outside to attract attention whether open or closed. Easy to fold and fill, it's another reason why Bell Products Co. of St. Louis says, *"25% of our sales result from Weyerhaeuser know-how in merchandising."*

**Cartons are single die-cut sheets of boxboard,** gold-coated on one side and so folded that the inside of the double-thick cover extends to form one side of the "picture frame." Tab for locked closure "floats" between the cover sheets.

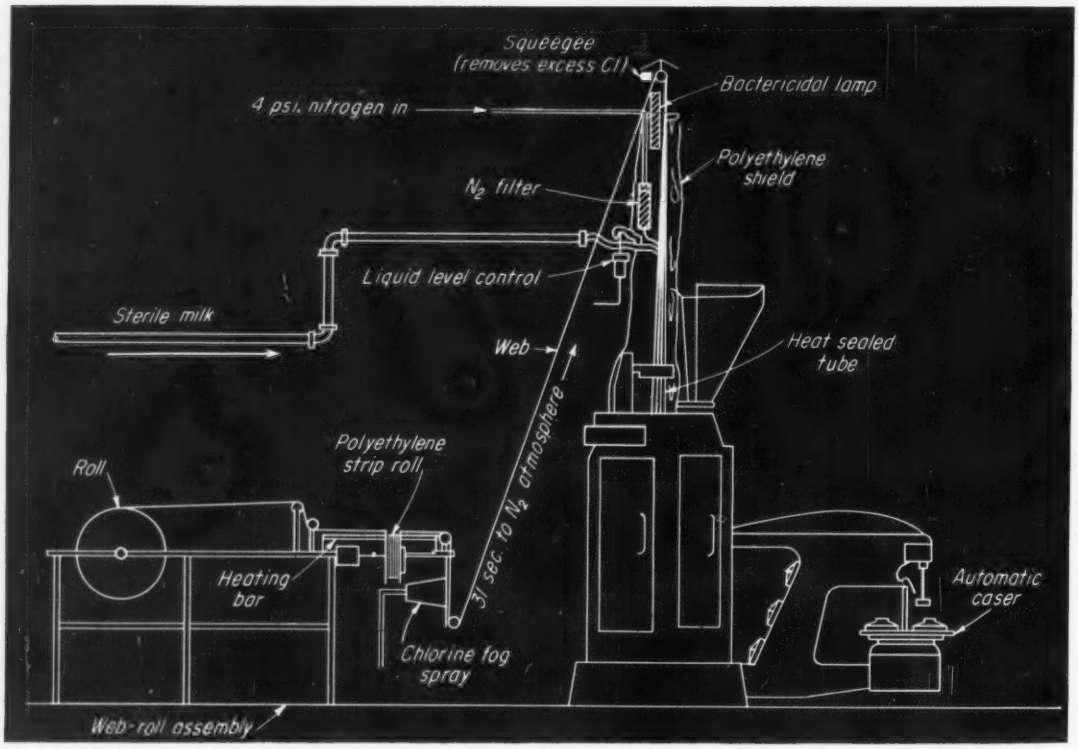



**Inner edges of the side "picture frame" members are glued to the bottom section** so that folding the carton automatically forms the frame bevels, and assembly is locked by folding over the two end cutouts. Instruction sheet is slipped under the "picture frame," the earphone goes into a receptacle at one side, and the radio fits snugly within the gold display case, yet may be removed for ready inspection.

***Write today for this interesting folder.*** It tells the whole Bell Products packaging story.

**Weyerhaeuser Company**
Boxboard and Folding Carton Division
Headquarters, 919 N. Michigan Avenue • Chicago 11, Illinois

PLANTS AND SALES OFFICES COAST-TO-COAST • A NATIONWIDE STAFF OF PACKAGING SPECIALISTS




**HEART OF PROCESS** is modified Tetra-Pak unit that forms paper-foil-polyethylene laminate into sterile, leak-proof hermetically sealed container. To insure its sterility, laminate (as fed from roll, left) is sprayed with 400 ppm. Cl solution. Excess is removed by squeegee (top of machine), then web passes bactericidal lamp. For further protection, sterile nitrogen gas is fed to filling area to blanket product until package is sealed.

# Now—Sterile Packing 'Tetra' Way

**Low-cost containers of special laminate are formed, filled, and hermetically sealed in inert gas. And 2-step sanitizing guards product—whole milk or other liquid foods — against contamination**

WHOLE, STERILE MILK in paper containers—newest concept of aseptic packaging—is a startling development offering big advantages.

Made possible by: (1) A revolutinary, low-cost, laminated paper, and (2) modification of a standard Tetra-Pak machine (FE Sept. '53, p. 48) to fabricate a sterile package with hermetic seams, its outstanding advantage is economy.

Costs of producing and filling any container with sterile milk are relatively standardized. Here, however, a saving of nearly 50% is shown in a cost comparison of the conventional 8-oz. container and a prorated cost of its shipping case vs. the identical costs incurred by this new package and its hexagonal case.

**Other products that may be processed and packaged by this line are: Tomato juice, paste, and puree; coconut juice; many fruit and berry juices or nectars; low sodium milk; egg nog; 3-1 milk concentrate; baby formulas, and soups.**

**C. R. HAVIGHORST**
Senior Associate Editor, "Food Engineering"

## 4-Way Cooperative Effort

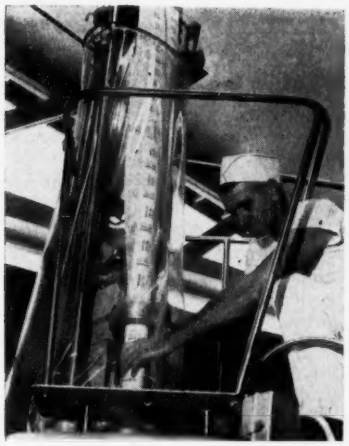
The idea was sparked by Real Fresh Milk, Inc., Visalia, Calif., whose executives—Robert J. Graves and his father, Roy R. Graves—are well known as pioneers in the processing of canned, sterile milk (FE June '51, p. 71). They were the first commercial users of the Dole (Martin) Aseptic Canning System.

Others involved were: Crown-Zellerbach Corp., San Francisco, credited with developing the new packaging material; The Tetra-Pak Co., Lund, Sweden, which aided in modifying the forming-filling unit; and Graves-Stambaugh Co., Chicago, which provided process engineering know-how and equipment.

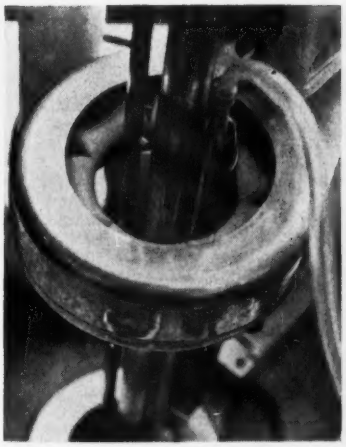
## About Tetra-Pak Unit

To produce the tetrahedron-shaped container, paper is fed from a large roll into the top of the Tetra-Pak machine. As it moves downward, sheet is formed into a tube and the long seam is heat sealed.

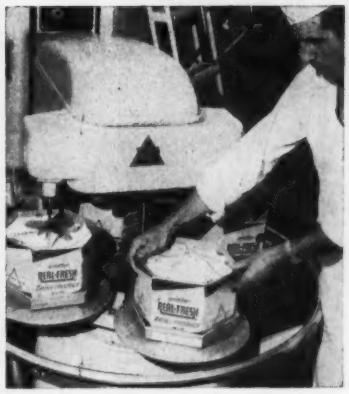
Then a pair of jaws move together



**AS WEB OF LAMINATE** moves downward in machine, it is formed into a cylinder, and long seam is heat sealed.



**PRODUCT SUPPLY LINE** (center), nitrogen pipe (left), and liquid level tube (right) enter cylinder just above forming ring, extend to filling area.



**AS SEALED PACKAGES** leave filler, they are automatically loaded in special tetrahedron-shaped paperboard containers.

to form, by heat sealing, individual packages. These jaws, mounted on an endless chain, provide motive power that moves the tube through the machine. In a vertical plane, they are positioned at 90 deg. to each other, which accounts for the tetrahedron-shaped carton.

Filling is via a stainless supply pipe extending down into the paper tube and maintaining level of liquid just above point where seal is formed.

Flow of product is regulated by a fulcrum device that compresses a short Neoprene hose in the liquid line. It is actuated by a liquid level instrument composed of a sensitive diaphragm and a tube immersed below product level. As product rises in tube, air pressure increases and actuates the diaphragm. This trips an air valve which operates the fulcrum.

Pertinent changes made in the machine were: Installation of an additional pipe to permit introduction of nitrogen gas (4 psi.) into the formed paper tube, and modification of heat-sealing jaws.

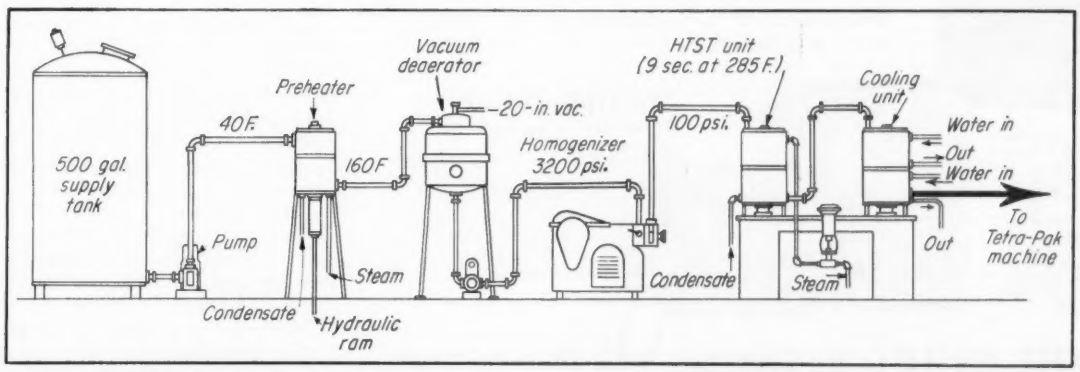
## New, Stronger Seams

The standard machine fabricates a wax-coated paper container with seams bonded by heat fusion. This container is used for non-sterile refrigerated liquids, such as pasteurized milk, orange juice, and other beverages. The new material (90-lb. paper, laminated with 1-mil foil, covered by an extrusion of 2-mil polyethylene) provides a leak-proof, hermetic, odorless container completely protecting the sterile product under normal conditions.

To provide additional strength one-half the width of a ½-in. poly strip is applied to the heated outside edge of the web at the web-roll assembly. The other half is heat/pressure sealed to the inner side as the machine forms a vertical cylinder. Thus, the film laminate on the surface of the web overlaps and is bonded to that part of the strip on the outside of the tube. And the gas-tight side-seam is perfected by bonding the other half of the strip to the inside of the tube.

Because this new material is of heavier caliber than the conventional paper, heat fusion would not provide a hermetic top and bottom seam. So, as previously stated, the sealing-jaws were modified. They now utilize electric impulse heat sealing, which effectively bonds the poly surfaces. Two voltage indicators/regulators provide means to adjust voltage and insure hermetic seams.

In simultaneous action, the two jaws rise, grasp the tube, and this pressure, plus the electric impulse




**MILK IS STERILIZED** by special process employing preheater, deaerator, HTST, and cooling units of unique design. Cooled product moves directly to modified Tetra-Pak filling machine.

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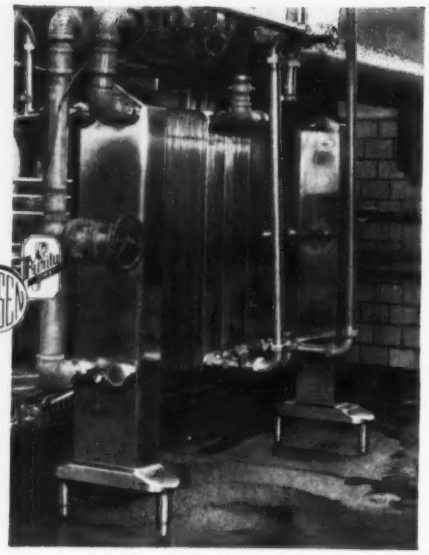
CHESTER-JENSEN
PLATE
HEAT
EXCHANGERS



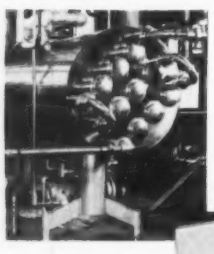
**Heat and Cool**
**any homogeneous pourable liquid at efficiencies . . .**

# As High As 90% Regeneration

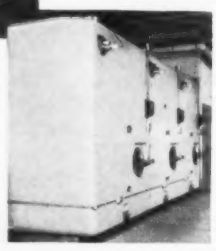
Chester-Jensen Plate Heat Exchangers offer the efficient, simple and economical solution to problems involving the heating and/or cooling of homogeneous pourable liquids.

Used as regenerators, efficiencies up to 90% are obtainable depending on the service. When a product must be heated from and cooled to temperatures beyond the regenerative range, auxiliary heating and cooling sections can be installed. The heating medium may be hot water or low-pressure steam; the coolant, city water, chilled water or brine — as when single-stage heating or cooling is employed.

Means are provided for removing the product from and returning it to the plate machine at any stage of heating or cooling. Pressures may be as high as 100 psig. Units are built in several types covering a wide range of capacities, which depend on product and temperatures. Battery installation is easily arranged.



Units are built entirely of stainless steel or with stainless steel at all product-contact points; are of sanitary design and readily demountable. This particularly recommends them for use in the chemical, pharmaceutical and food industries, and in all others where corrosive liquids are handled or cleaning, either by circulation methods or manually, may be required.



High-temperature Shell - and - Tube heater above is readily opened for inspection of stainless steel tubes; may be cleaned by circulation if required. Three-compartment, stainless steel tank at right is insulated and refrigerated.

**CHESTER-JENSEN**
**Products Also Include**

. . . Shell-and-Tube (Ste-Vac) Heaters; Beaudelot Coolers (Fan or fixed wing); Vats, for heating, cooling, mixing, vacuum treatment; Horizontal-Cylindrical and Rectangular Tanks, insulated, refrigerated and multi-compartment . . . and numerous other items.

*Correspondence is invited.*

**CHESTER-JENSEN COMPANY, Inc.** 347 Tilghman St. (Dept. S) CHESTER, PA.

Specialists in Stainless Steel Industrial and Food Equipment



from anvil to electrode jaws, form the two seams. As the jaw assembly descends, the filled, sealed carton is severed from the tube and elevated to the automatic caser.

In the modified machine, the filler pipe and the nitrogen and liquid level lines enter the partially formed cylinder and project downward into the formed tube. The liquid level instrument maintains product level at a point a few inches above the extreme vertical reach of the upper sealing jaws. The top seam of the carton is made below this level, producing a filled carton without headspace, that improves product keeping quality and shelf-life.

Purity of the nitrogen is insured by filtering it before it enters the filling area.

## Chemical Asepsis Used

Since temperatures required for thermal sterilization would damage the laminated packaging material, another safe, reliable means was needed to aspecticize interior surface of web. Here chlorine, long used as an effective sanitizing agent for dairy equipment and pipe systems, offered a possible solution. To apply it without damaging the paper, a fog-spray device was developed. As the web moves past this device its product-contact surface is subjected to a spray of 400 ppm. chlorine.

It requires but 31 sec. for the web to travel from this point to the top of the Tetra-Pak unit and into the atmosphere of sterile nitrogen. Enroute it passes a squeegee, that removes residual solution (which is piped to waste), and a bactericidal lamp, positioned for optimum effectiveness.

## Process Accents Efficiency

Real Fresh has been producing the following canned sterile mix products, largely for export: milk, half-and-half, whipping cream, chocolate drink, and an ice cream mix. These products are packed by the Dole Aseptic Canning System. The same processing line now serves the Tetra-Pak unit.

With the exception of the homogenizer, all equipment, and the process were developed and patented by Graves-Stambaugh Co. Preheater and HTST units are identical in design. Cooling unit differs in that it has a wider helical groove. (All modifications to the Tetra-Pak and the web-roll assembly are patented by G-S.)

The heat exchangers comprise two

elements: An outer jacketed shell, and an inner, slightly cone-shaped element, with helical grooves having a cross section of approximately 0.01 sq. in. (Food Industries, June '49, p. 72). HTST sterilization is achieved without noticeable flavor impairment as product moves through this unit and the cooler at 23-24 ft./sec. in turbulent flow. Each unit is equipped with a hydraulic ram to elevate the heavy inner element for effective sanitation. Process is automated with Minneapolis-Honeywell temperature-recording instruments.

A vacuum-deaerator retards product oxidation. It removes entrapped oxygen from the milk which, at the filler-spout, contains only 0.10-0.14 volume percent oxygen. After packaging, residual oxygen combines with sulfhydral compounds and vitamin C and, in a very short time, is reduced to below 0.1.

Before operating, the entire system, including the $N_2$ line, is C.I.P. steam-sterilized.

## See Revolution Ahead

Many companies, including chains expanding vertically into food processing, are evidencing quickening interest in canned sterile concentrated milk. In fact, it's reported A&P will soon market its own brand of this product.

Currently, milk concentrates (2-1 and 3-1) are produced in the Midwest and shipped for distribution in the South, where a shortage exists. If this trend continues, it may be that Tetra-Pak sterile milk will become one of the leaders—especially since it would permit once a week delivery of milk that needs no refrigeration.

This could amount to a revolution in the dairy field, bringing a demand to balance the cost of manufacturing grade milk with that of grade A fluid milk. Presently, this is largely a potential hazard to companies striving to make the fluid milk business more profitable. Several dairy companies could establish one processing plant in a heavy producing area. This plant would produce sterile cream and ship it to the proprietary companies. The plant could also prepare such other products as chocolate milk.

Real Fresh proposes an entirely different marketing approach. Not interested in disrupting the present market, this company has just licensed Carnation Co., Maryland & Virginia Milk Producers Coop., Bireleys, and North Carolina State College to use the process. —*End*


The big PLUS SERVICE EXPERIENCE RESEARCH PERFORMANCE in Oakite

**How an Oakite Coordinated Sanitation Program can reduce sanitation costs for you**

An Oakite Coordinated Sanitation survey of your plant gives the same effect as adding a sanitation expert to your maintenance staff —except in one respect. It doesn't cost a cent. It *does* do this:

1. *It is virtually guaranteed to cut your total plant sanitation cost.*
2. *It keeps your equipment at top operating efficiency . . . prolongs its productive life.*

A Coordinated Sanitation survey is simply an experienced and expert over-all view of everything involved in plant sanitation. It shows you economies on materials . . . reduces the number of types you need . . . points out where it will pay you to *mechanize* cleaning . . . details the savings in cleaning crew time and toil. And it's programmed to provide maintenance cleaning *before* trouble occurs.

In his survey of your plant the Oakite man would cover such jobs as produce washing, conveyor chain lubrication, use of mechanized cleaning equipment, brightening stainless steel equipment, cleaning of pasteurizers, evaporators, stills, cookers, filling equipment, etc., end-of-season clean up, odor control, truck washing, floor washing.

**The big PLUS in Oakite**

Just one of the plus factors you get with Oakite materials, the Coordinated Sanitation survey combines the experience of the entire Oakite organization, and the latest cleaning research. It's accomplished by a man who really knows his business—and a lot about yours, too. To learn more about it, call your local Oakite man today, or write for Bulletin. Oakite Products, Inc., 26G Rector Street, New York 6, N. Y.

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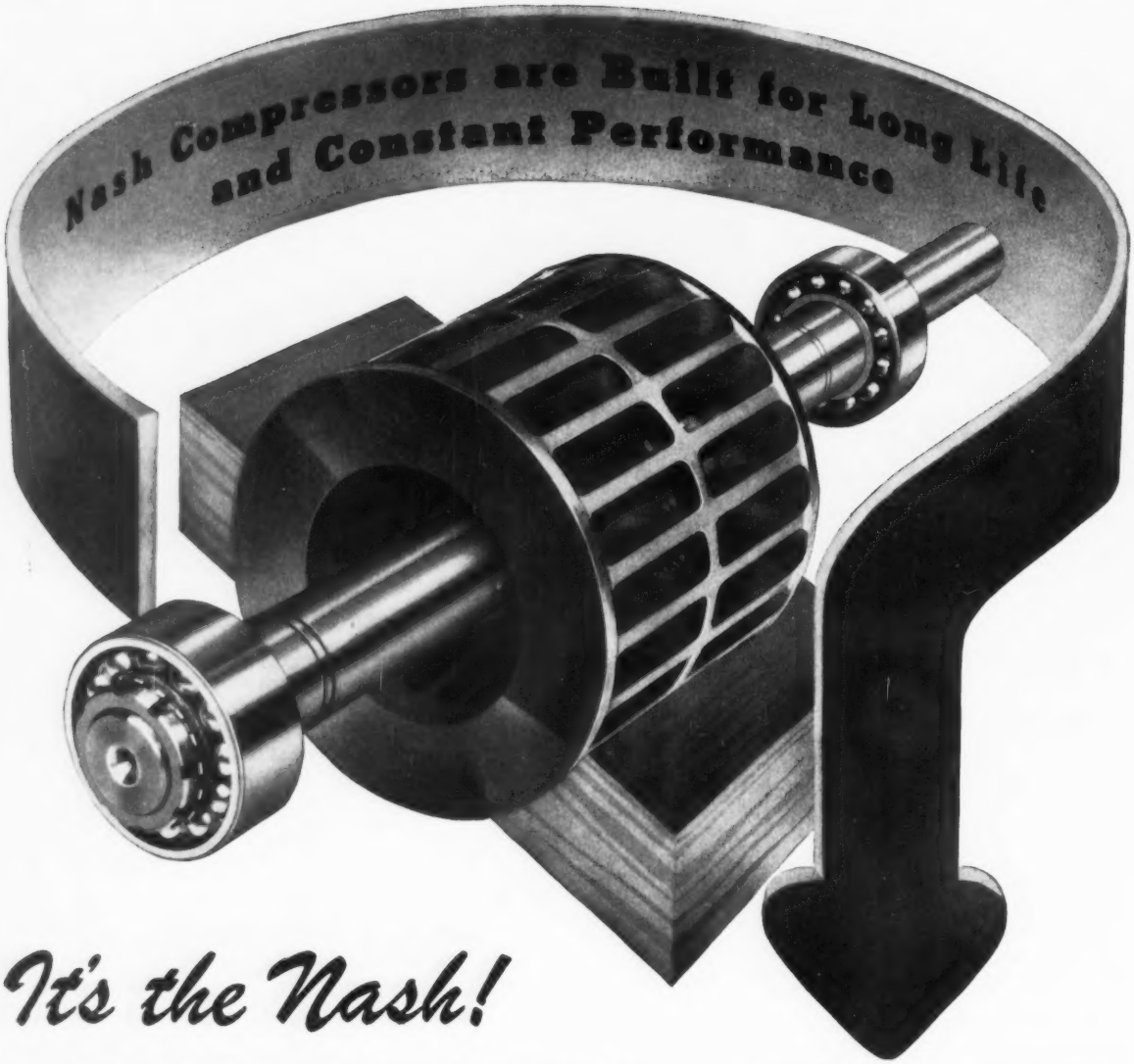
over 50 Est. 1909 SCIENCE
years' leadership in industrial cleaning

Technical Service Representatives in Principal Cities
Export Division Cable Address: Oakite




CIRCLE 51 ON READER SERVICE CARD 51




# *It's the Nash!*

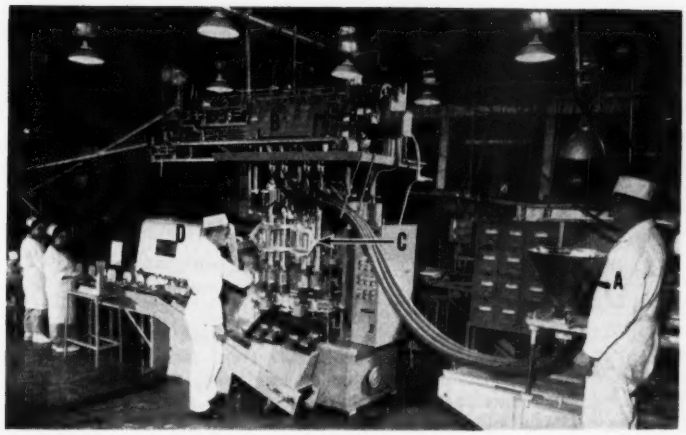
The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

- No internal wearing parts.
- No valves, pistons, or vanes.
- No internal lubrication.
- Low maintenance cost.
- Saves floor space.
- Desired delivery temperature Automatically maintained.
- Slugs of liquid entering pump will do no harm.
- 75 pounds in a single stage.

**NASH ENGINEERING COMPANY**
**312 WILSON, SO. NORWALK, CONN.**




**ADVANCED LAYOUT** for pouch-in-carton operations hooks filler (A), can dump (B), former-filler-sealer (C), and cartoner (D) in straight-through sequence. Line accommodates sugar- or syrup-packed products as well as IQF items.

# Faster Pouch Packaging

**New machine and unusual can dump combine to up bag-in-box filling rate . . . Big cost savings, too**

SPEEDIER, MORE FLEXIBLE in-plant handling of pouch-in-carton containers is won by a new operations concept getting its first trial at Shasta Freezers, Watsonville, Calif.

The setup (FE July '59, p. 46-7) is designed to answer complaints of limited speeds in pouch packaging.

The faster packaging is achieved by a new Hayssen 4-tube forming-filling-sealing machine that whips out 120 polyethylene bags (10 oz.) per min. This compares with 48/min. capacity of 2-tube unit previously used.

Increased versatility is brought about by processing the product through an Elgin piston filler that loads a new dumping conveyor line used to carry the product to the pouch former. The special dump arrangement permits the packer to adapt any type of existing filling equipment to his bag-in-box line.

In operation, filled cans run from filler to pouch former, where they're upended and dump their contents into four filling mandrels, then drop to a lower line and return to the filling station.

Shasta will run 10-oz. sliced strawberries on the new line. However, Western Waxide Div. of Crown Zellerbach, developer of the pouch-in-carton, says the setup also can handle IQF vegetables for both 20-oz. poly sacks and individual-service boil-bags. Green beans and peas, in 4-oz. pouches of 2-mil poly, will soon be added by Shasta.

Western Waxide sees the pouch-in-carton as competitive with the metal end container—which, reportedly, accounts for 90-95% of the frozen sliced strawberry market. The pouch represents a hefty 35% cost savings, the packager asserts.

Here's how the company figures out the savings on comparable 10-oz. sizes: Total cost per 1,000 units comes out to $3.18 for pouches (2¾-mil) and $13.23 for printed cartons, for a total of $16.41. This compares with $26.50 for the metal-ends.

Labor costs are considerably higher with the pouch—$1.57 vs. 36¢, based upon an output of 9,000 units/hr. That's because the bag line requires 8 workers against a single filler-seamer operator for the metal-ends.

However, this still leaves the total pouch costs 35% below the metal-ends—$17.98 vs. $26.86.—*FE Staff*

IN every process, La Porte out-performs and outlasts other types of conveyor belting. It firmly grips the friction drum or La Porte Sprocket to eliminate *creeping, weaving* and *jumping*. It has a perfectly flat surface for handling all types of containers, empty or filled. Open mesh feature provides for circulation of air, heat, cold or moisture around products in process. Also facilitates cleaning or sterilizing with steam or scalding water while in motion. Highly resistant to heat, cold, oils, brine. You get more for your money in a La Porte.

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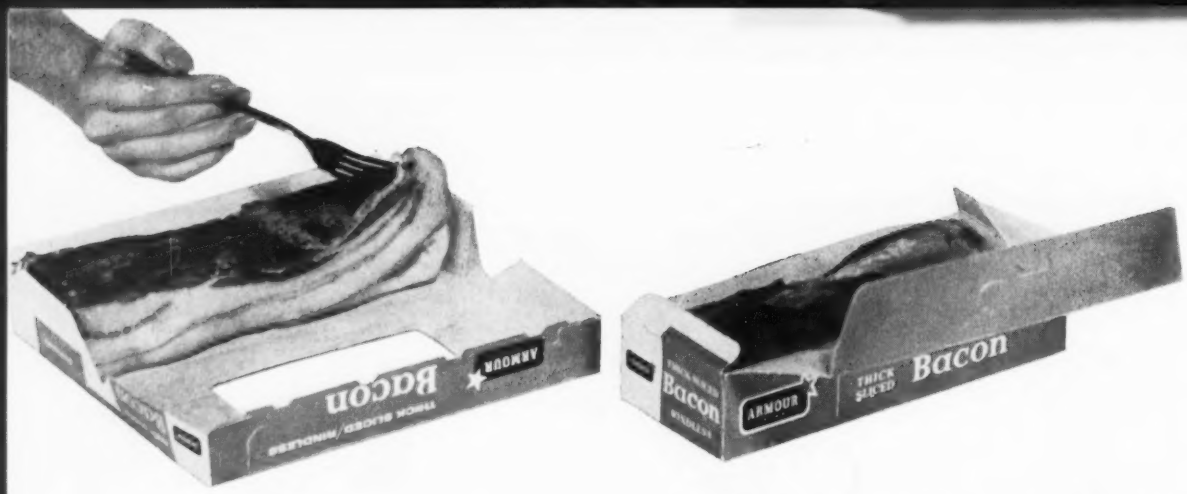
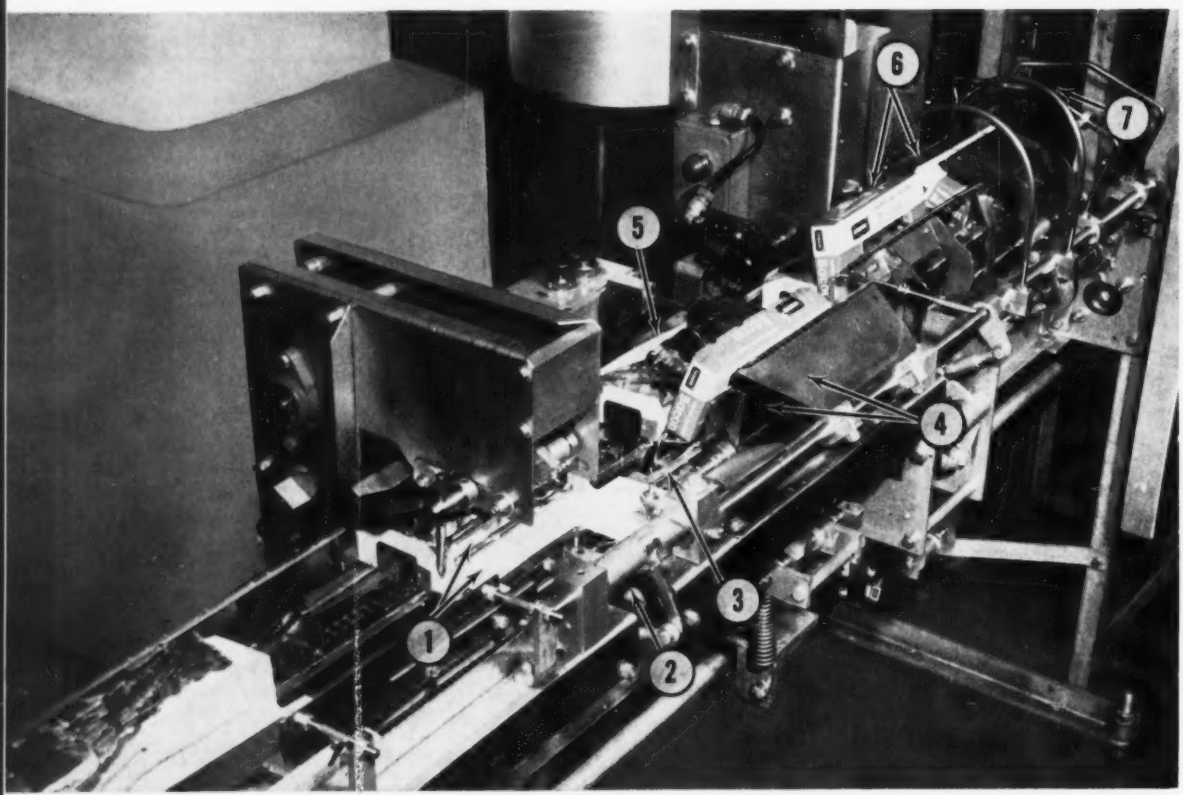
CIRCLE 53 ON READER SERVICE CARD 53




SLICES are stripped in a jiffy (left) from new, clean, easy-open and easy-close carton. Previously, consumer had to pry strips out of less handy tongue-and-slot box-like package (right).

**Using new decade concepts, West Coast Armour plant meets consumer-taste challenge by improving bacon carton and mechanizing for increased capacity, efficiency**

# Preference-Appeal Payoff: Special




NEW LINE & 'BLUEPRINT'. In sequence (per corresponding numbers on photo and drawing), bar (1) presses bacon against carton's front panel, then major folding steps follow at points (2), (3), and (4). Next, front panel

## Creating The Package

# Package & Mechanizing

AT ONE and the same time, consumer preference can be a very challenging and very sobering marketing factor. Hence, shaping your package to cash in on it calls for meticulous ranging and most careful approach.

**Often, this dictates a critical re-evaluation of both package and production principles.**

Armour & Company, of south San Francisco, faced this task in its West Coast bacon market–and ended up changing not only its carton but also its whole packaging-line operation.

Here's why and how:

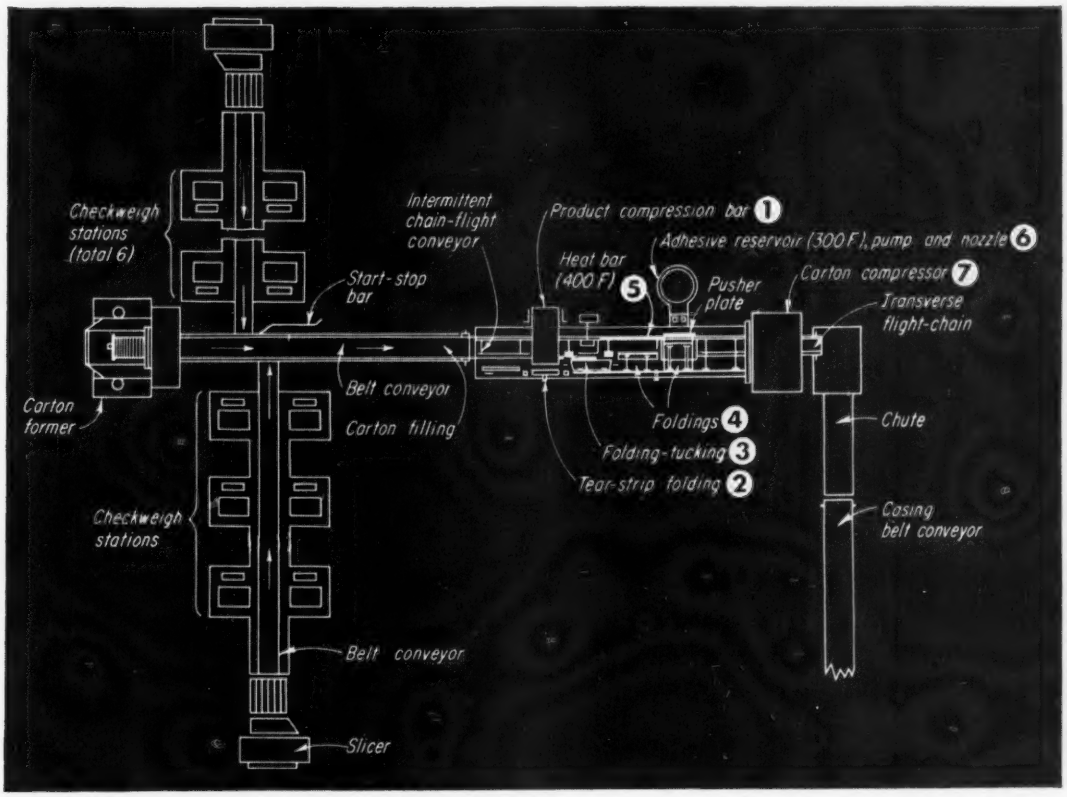
Preference for bacon in this area had been running to thick-slices in 2-lb. packages. But costly production, plus the problem of grease-marked cartons, had balked this packer from fully capitalizing on the market choice.

Following the "Total Packaging" concept of its new development and design department (FE Sept. '59, p. 60) and enlisting the aid of Container Corp. of America, Armour solved the problem and bolstered marketing efficiency through package redesigning and production mechanizing–the Speed-Line.

Providing impressive advantages, its new package–

- **Eliminates grease smears.**
- **Easily opens and recloses.**
- **Requires less storage space.**
- **Reduces pilferage.**

Formerly, hand-packers had to insert tongue of old carton into slot,




**moves along 400F. heating-bar (5), after which carton is glued and closed (6) and finally enters seal-compressor (7). Per checkweigher, Speed Line turns out 7-8 sealed packages/min.**

How United States Testing Company helps

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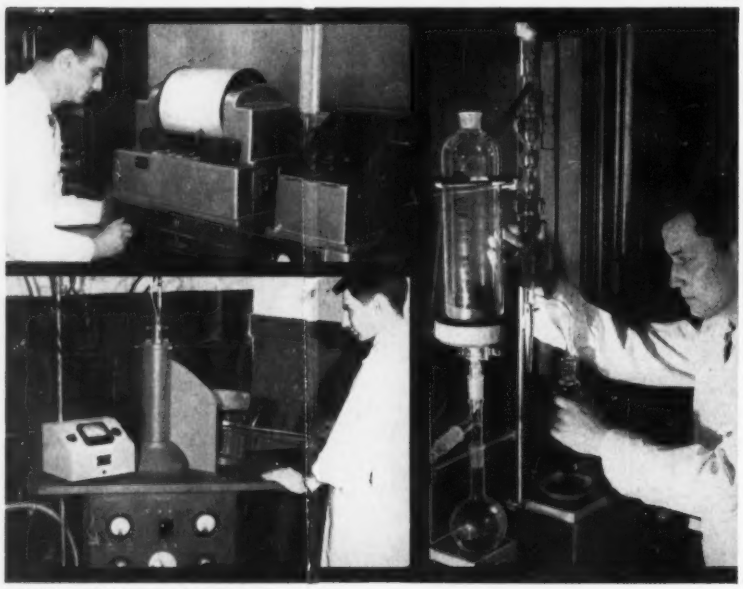

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causing the smears. Currently, hand-filling continues. But the new package is mechanically handled thereafter. Opportunity for pilferage is limited because, once glued cover is opened, it cannot be reclosed like the tongue-and-slot package.

Consumer, of course, easily opens package by running a fingernail under flap to break adhesive bond. When cover is lifted, the tucked back side-panel also opens, permitting easy removal of bacon. Customer peels off slices instead of prying them from box as with former carton.

Sizes of both packages are identical (9¾x3¾x2-in.). But the CCA cartons come compactly flat, packed 750 blanks to a case. Former, infolded, hinged-cover cartons were shipped in 250 lots and in even larger cases. Result: Savings of two-thirds storage space and reduced handling costs.

## Line Capacity Zooms

Rate of manual packaging was approximately 2½ cartons/min. per scaler. But with the new line, Armour got 7-8/min., and four checkweighers gave a guaranteed speed of 18-36 cartons/min. (with actual performance showing even higher rates attainable).

Since then, there's been a new boost, for another eight checkweighers have been added (total now twelve, see drawing).

Other savings are—

- **Less overall handling.**
- **Reduced work force on line.**
- **Drop in material costs.**

In addition to releasing some hand-packers to other jobs in plant, mechanical handling permits use of 15 pt. (solid bleached) sulphite instead of the 20 pt. formerly required. Greater strength of new design allows use of the lower-caliper material.

Entire line is driven by a torque-shaft through a Geneva drive 3-hp. motor located in the Klik-Lok carton former. Control is manual from three different locations. Line runs continuously, but carton flow is controlled by operator.

Sliced bacon is checkweighed and 2-lb. blocks move on conveyor to filling station. Operator activates carton supply with a stop-start safety-bar located about waist-high, leaning against bar when cartons are required and moving away to stop supply.

The carton former folds front part of scored package. Filled, partially made carton then moves on belt conveyor to the Speed-Line's chain flight intermittent-conveyor.

As cartons enter unit, bacon block is pressed against front inside panel

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Quality-conscious food processors, canners and packers from coast to coast are using Morton '999' Salt because it is the one ingredient you can always depend on for unvarying high quality. In fact, the constant quality of '999' Salt has become the standard of the food industry. With Morton '999' Salt you insure a cleaner, more uniform flavor in all of your processed foods.

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**'999' is available everywhere—accept no substitute.** Morton '999' is the highest purity salt commercially available anywhere in the United States. '999' quality never varies from shipment to shipment, whether you buy it in bulk for direct salting, or in tablets made to your own specifications—either straight or blended with other flavoring agents. Send for complete information today!

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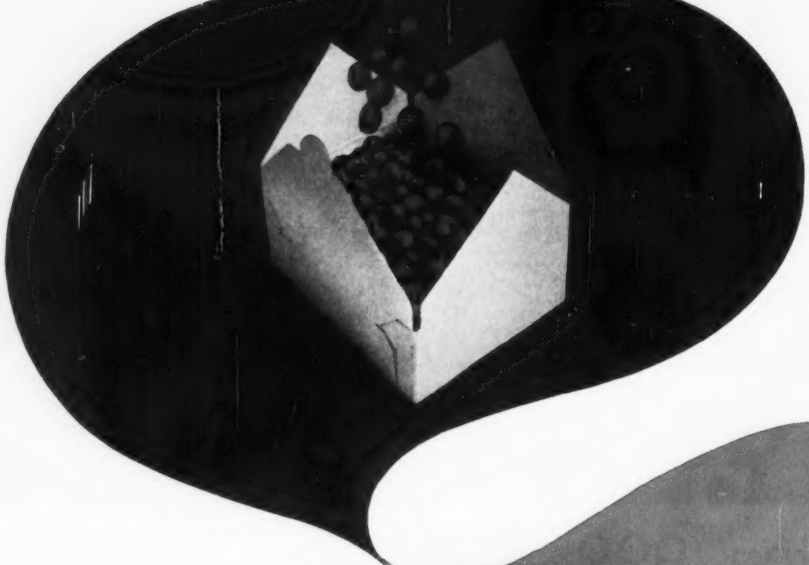
**MORTON SALT COMPANY**

INDUSTRIAL DIVISION

*Dept. FE-3, 110 N. Wacker Drive, Chicago 6, Illinois*

# PACK IT

## in Funnel Pak cartons



**Lower costs with CCA's new Funnel Pak*.** Reduces carton and labor costs. This top-opening frozen vegetable package uses considerably less paperboard, reducing costs substantially. And Funnel Pak minimizes product spill. Get a better package at a lower cost. To **pack it—move it—sell it** is the business of CCA packaging.

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CCA

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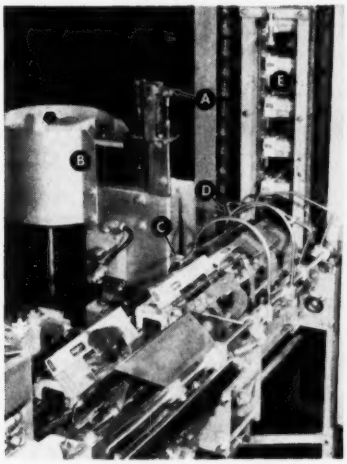


**GLUEING-STATION ACTION: Triggered by carton moving on conveyor (L. to R.), switch activates pump (A) to send glue from reservoir (B) to nozzle (C), which applies it to package's front panel. Then carton is closed (D) and travel in compressor unit (E) assures strong bond.**

by cam-action, spring-loaded compressor, thus isolating block from unfolded scores.

Carton moves to two cam-operated gusset-tuckers, which form back panel and elevate cover to 70 deg. angle. In this position, front panel is warmed to assure adhesive bond.

## Seals Automatically

Container now trips a switch in glue pump and measured amount of adhesive is applied to front panel by nozzle. After cover is closed, carton goes into one of the pockets of horizontal compressor unit.

This chain-operated, 24-pocket, converging rail unit then moves cartons upward as pressure is gradually applied to seal. Finished packages are then discharged via transverse conveyor.

Switch at discharge detects any improperly closed cartons and stops unit to allow their removal.

During operation, Speed-Line's adhesive reservoir is thermostatically controlled at 300F. Glue is delivered to nozzle at 250-275F. Nozzle has own built-in heating element that keeps adhesive (Nicol-Melt) hot enough to halt hardening.

Another control pre-determines proper amount of glue flow, whereupon pump is regulated to continuously apply the right quantity.

Complete unit is built of non-corrosive materials approved by USDA.

—End

# Planning ahead can save $20,000 on fluid mixing

*An idea from your LIGHTNIN Mixer representative's briefcase*

This engineer is listening to an idea that's going to save his company $20,000 on fluid mixing.

He's working on a process that will employ mechanical mixers. But in a year or so, process requirements are expected to change, throwing 15% greater load on the mixers.

**Problem:** how can he anticipate this change *now?*

**Solution** proposed by LIGHTNIN Mixer representative: install standard turbine-type LIGHTNIN Mixers geared for the immediate job, but sized to handle the expected load.

When requirements increase, simply change impellers and two gears in each mixer—providing correct power input for the new conditions at minimum expense.

**What this man can do for you**

This is one example of the many ways your LIGHTNIN representative can help you get efficient fluid mixing at lowest long-term cost.

He can give you better service on fluid mixing than anyone else—because he has seen and done more of it.

Take advantage of his unmatched experience by putting him on your process-design team. For prompt help on any fluid mixing operation, call him in now. He's listed in Chemical Engineering Catalog. Or write us direct.

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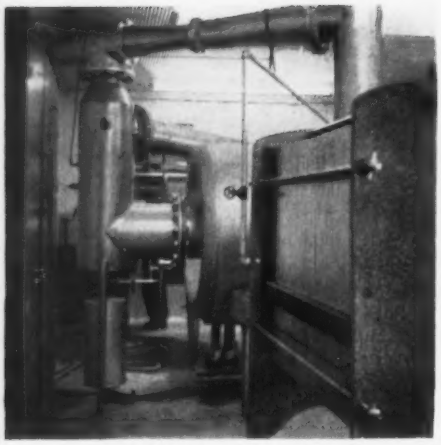
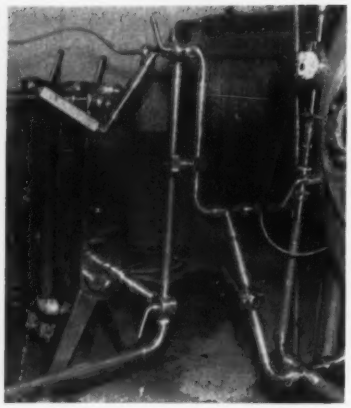
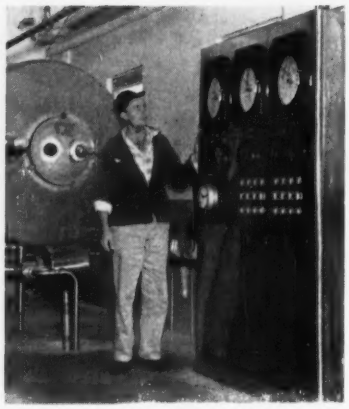
CIRCLE 59 ON READER SERVICE CARD 59



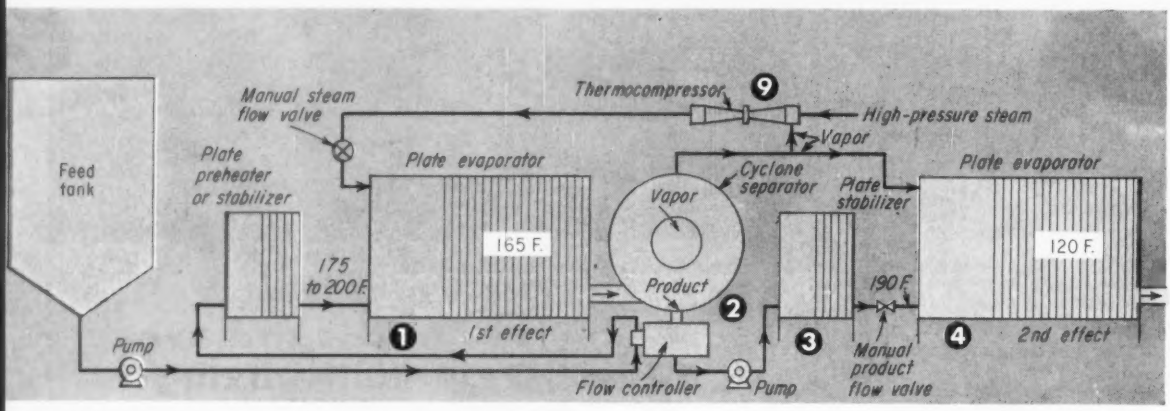
1, 2 & 9—First-effect plate evaporator (right), vapor separator (center), and thermo-compressor (near ceiling). See numbers on flowsheet.



3 & 4—Plate preheater or between-effects stabilizer (left) and 2nd-effect evaporator.



5—Second-effect vapor separator (left), with discharge flow controller below it. Instrument panel is at right.




# Revolutionary Plate Evaporator

**MANUFACTURING**

**Compact, flexible HTST unit greatly reduces costs, protects quality. British development applied to wide variety of liquids here and abroad**

OUT OF EUROPE has come another innovation in food processing that is finding significant application in the U. S.

It is a space and cost-saving plate-type evaporator (FE Jan '59, p. 68) that provides operating flexibility and slashes cleaning downtime and labor, requires few controls, and can easily be modified to up capacity.

There are 35 or more installations throughout the world—4 in England, half a dozen in the U. S. (or soon will be), and others in Canada, Switzerland, France, Greece, Brazil, South Africa, and Japan.

Latest in this country has just gone into full commercial operation at Snively Groves, Inc., Winter Haven, Fla.—where it is concentrating orange juice containing pulp. This installation replaced a pilot unit that proved its worth in 2 months of operation last season. Used in England 3 years, the pilot plant then did duty in Jamaica, where Snively executive W. W. Giddings saw it and brought it to Florida. Now it is concentrating Sunkist lemon juice at Corona, Calif.

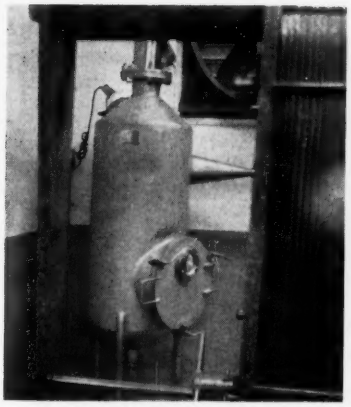
At Snively, a 12,500-lb. per hr., double-effect, plate evaporator and auxiliaries are installed in a little 18x27-ft. room with a 9-ft. ceiling and no extra floor reinforcing beams. Compare that with a conventional 25 or 30-ft. tall evaporator installation, and you get a picture of extraordinary compactness.

And this unit is concentrating to 65 Brix—can do 72 Brix—in about 1 min. throughput time!

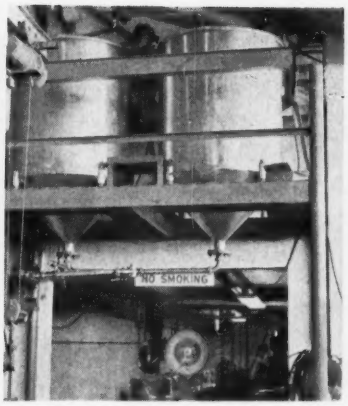
Heat contact time is but 10 sec. in the first effect; total time there, only 20 sec. Then the juice spends about 40 sec. in the second effect, where there is a limited amount of recircu-

**FRANK K. LAWLER**

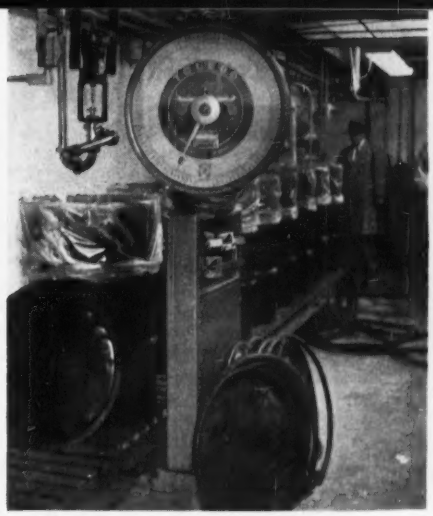
Editor, "Food Engineering" (Photos by FE)



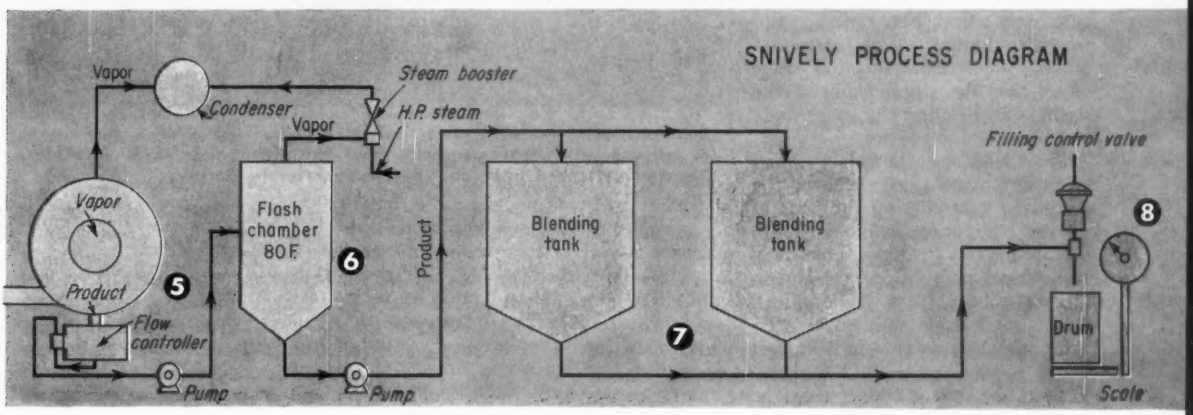
6—Flash chamber where concentrate is cooled to 80 deg. F. and Brix increases to 65.




7—Two blending tanks which receive concentrate and supply drum filler by gravity flow.



8—Scale controlled valve regulates filling of concentrate into polyethylene-lined drums.




# Concentrates Orange Juice

lation to make certain that the heating surface is fully covered.

There is less than 5 gal. of product in each effect at any time! This and the quick-through feature are distinct plus-values in respect to quality, operating flexibility, cleaning, and cleanup downtime.

Both first cost and operating expenses of the plate evaporator are low. Capital investment is about half that for conventional equipment. And when on-stream, steam consumption is about one-third and water requirements one-fifth the quantities required by other evaporators. It can be cleaned with 75 gal. of 1% solution of caustic soda, recirculated for 30 min. followed by a 10-min. rinse. It is back on stream in 60 to 90 min., compared to 4 or 5 hr. for other evaporators.

The many advantages of the plate evaporator stem from its design, operating principles, and temperatures.

## Special Operating Features

It is a short-time, high-temperature, vacuum evaporator. Juice is quickly exposed to 160 or 170 deg. F. in the first effect, to 120 deg. in the second effect.

If the juice is heated to "stabilize" it before entering the evaporator, it is taken to 175 to 200 deg. in a plate heat exchanger. If stabilized between effects, the temperature is 190 deg.

Designed for single-pass, climbing and falling film operation, the evaporator proper consists of a series of plates—40 in each effect. Somewhat resembling those in a heat exchanger, the plates are of special design to provide proper product and steam flow patterns. Made of 316 stainless steel, the $\frac{1}{16}$-in. thick plates are separated by $\frac{1}{4}$-in. rim gaskets. The bank of plates is 5 ft. long, $2\frac{1}{2}$ ft. wide and about twice as high. Mounted in a frame $7\frac{1}{2}$-ft. long, the plates are held together by two rods on either side, with quick-off hand-grip nuts that tighten against the rear holding plate. When the hold plate is released, the plates are easily separated for inspection.

And additional plates can be added readily to step up capacity.

Plates operate in units of four, each unit discharging concentrate to the evaporator outlet passage at the bottom. In once-through flow, juice passes upward between plates 1 and 2 and down between 3 and 4. Steam flows on one side of plate 1,

between plates 2 and 3, and between plate 4 and plate 1 in the next unit. Steam flow is one-pass downward to the condensate-discharge passage.

### Steps in Process

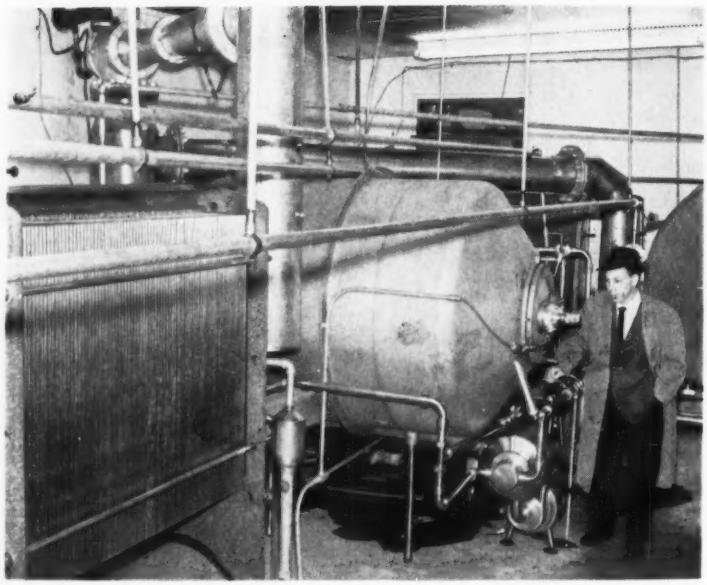
Concentrated juice from the plate evaporator in each effect flows into the bottom of a horizontal cyclone separator that removes the vapor. No taller than the evaporator, the cyclone cylinder has an 18-in. dia. vapor-suction tube centered on the cyclone's axis and extending about two-thirds of its inside length.

As the concentrate flows into the evaporator, the vapor swirls around this tube and enters its inlet. But the juice flows into a discharge trough in the cyclone's bottom, then into an automatic flow controller, and through the first-effect extraction pump. Vapor from the first effect passes over the steam plates of the second effect to heat the concentrate and boost Btu. efficiency.

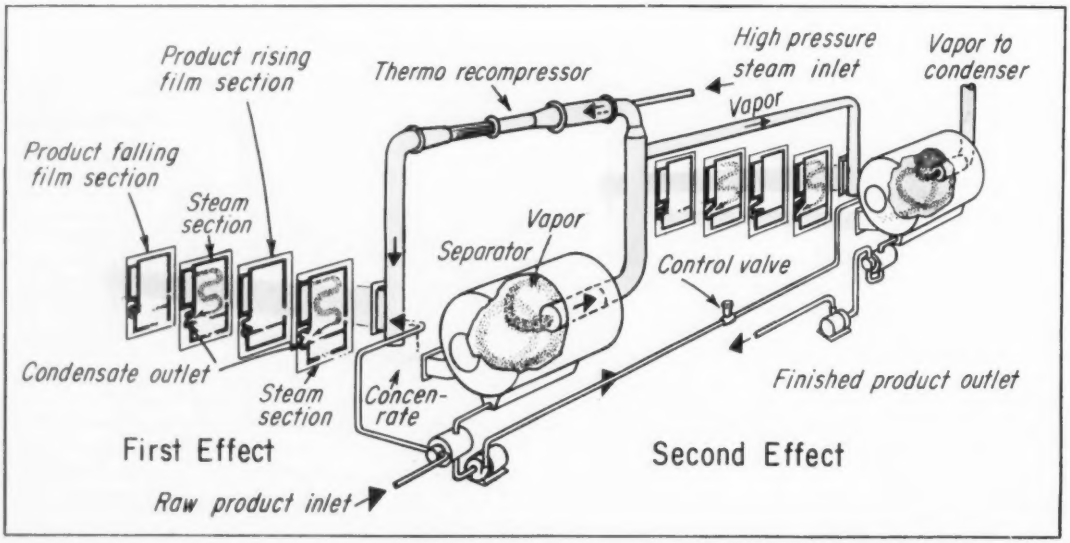
Flow into and through the first effect evaporator is regulated by the automatic controller on the basis of level of concentrate in the separator. Of special AVP design, the controller has a ported sleeve valve operated by a float. It's a simple, direct-acting mechanical unit that maintains proper rate of flow into the first effect.

From the control, the concentrate goes through a between-effects, precision, flow-regulating valve. This has a micrometer-type scale and is manually adjusted to obtain proper performance. It gives reproducible results when reset to the same point on its scale.

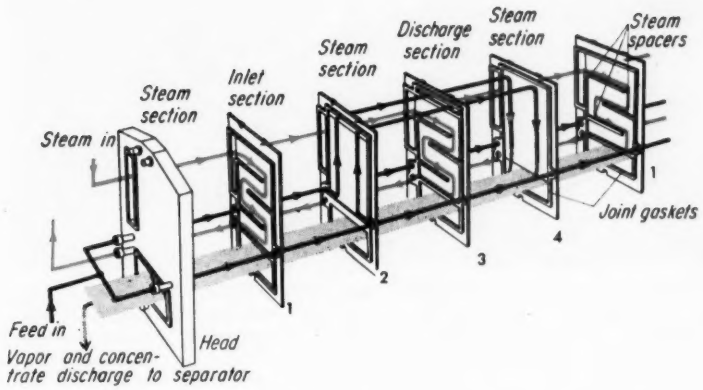
After passing through the stabilizing heater (if used), the first-effect concentrate flows through the second-effect evaporator, separator, and flow control. Finally it enters a flash chamber at 62 Brix and 120 deg. Here enough vapor flashes off under a 29-in. vacuum to boost the Brix to 65 and to cool the product to 80 deg. F. The flash cylinder is only 42 in. tall and of 20-in. dia.



**Compactness of installation is illustrated here. First-effect evaporator is at left, its vapor separator, with flow controller below it, is at center. Separator attached to second-effect evaporator is at right.**




**Dynamic schematic shows how evaporator functions. Flow of product, steam, concentrate, and vapor indicated.**




**Basic evaporator unit consists of 4 plates, with product flowing upward between plates 1 and 2, downward between 3 and 4. Steam flows between head and plate 1, between plates 2 and 3 and between 4 and first plate of next unit. Each evaporator at Snively has 40 plates.**

Vapor from the plate evaporators and the flash chamber passes into a condenser.

## Packaging in Drums

The 65-deg. finished concentrate is pumped to outside blending tanks, which feed a drum-filling operation. The bulk-packed product then goes to a can filling plant, where it is blended with concentrate from conventional evaporators.

In the opinion of W. W. Giddings and George Pulley, Snively executive and quality control technologist, respectively, quality of the product is that of a high-grade frozen concentrate.

Efficiency has been engineered into the drum-filling operation, too. Lined with polyethylene bags, the drums move single file on a roller conveyor into position under the filling spout and on a weigh scale. This scale actuates a pneumatic-diaphragm valve in the filling line to give accurate cut-off. As the contents of each drum nears the set weight, the valve throttles to give a final "dribble" flow for precision fill.

## Easy to Control

Juice evaporated in this Snively installation usually contains about 10% of pulp, the remainder having been removed by finisher (or pulper) screens and washed to recover lost solids.

Simplicity of control is a feature of the plate evaporator. The flow controllers at the outlets of the first and second effect separators maintain efficient evaporator operation. Only other controls are hand-operated valves to regulate steam and rate of feed to the second effect.

There is a small panel of instruments, however. On it are three recorders for evaporator and heater temperatures. And four gages indicate vacuums and pressures. Push-buttons to start and stop the operation also are on the panel.

Steam consumption is reduced in the plate evaporator by the use of a thermo-compressor. Each pound of steam evaporates 3 lb. of water instead of only 2 lb., as would be the performance otherwise. This provides steam efficiency comparable to what would be achieved with an extra effect. A conventional unit, the thermo-compressor passes high-pressure (100 psi.) steam through a nozzle to produce suction that boosts the first-effect vacuum from about 20 in. to 10 in.

### Products Processed by Plate Evaporator

| | |
|---|---|
| Skim milk | up to 50% |
| Whole milk | 50% |
| Buttermilk | 45% |
| Whey | 50% |
| Ice cream mix | 27% |
| Apple juice | 72% |
| Pear juice | 72% |
| Orange juice | 65% |
| Lemon juice | 50% |
| Apple pectin | 7% |
| Apple juice | 70% |
| Grape juice | 70% |

## Protects Quality

Short-time contact with heat in single-pass flow protects color, flavor, and other natural qualities of the heat-sensitive orange juice. And when used as part of drying process, minimum denaturation by heat is reported to improve solubility of the processed product.

Varied commercial applications of the AVP plate evaporator are indicated in the accompanying list. In addition, pilot plant work has been done on tomato juice to up solids to 40%, with good color. So promising is this application that further tests will be made this year by AVP.

Glucose, sucrose, and fish-stick water also have been processed.

## Land O'Lakes Likes It

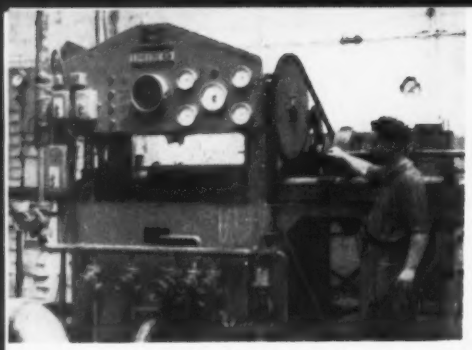
In the dairy field, an AVP plate evaporator has been concentrating skim milk to 45% solids at the Whitehall, Wis., plant of Land O'Lakes Creamery. And Manager Roy Carlson has expressed enthusiasm for its performance, control simplicity, and flexibility in changing the number of plates easily. He further observes that the evaporator can be cleaned in place in 45 min., compared to 2½ hr. for other unit evaporators.

## At Work Abroad

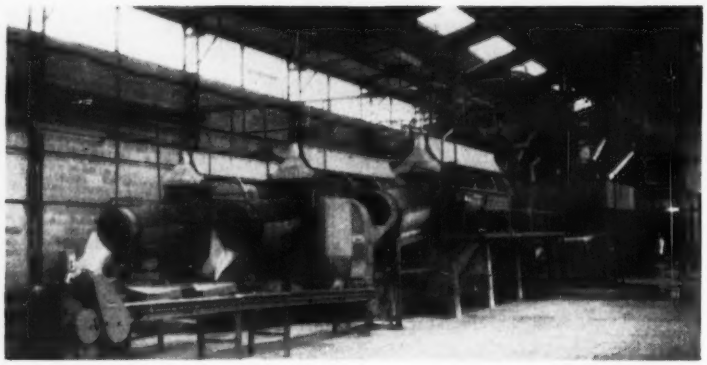
Among the overseas installations operating is one concentrating apple and pear juice from 12 to 72% solids, with a single-effect, 4,400-lb. per hour unit—Obipektin A.G., Bischofszell-Nord, Switzerland. Two in Great Britain concentrate skim milk from 9 to 27% solids. Wilts United Dairies, Ltd., Wootton Bassett Creamery, uses a triple-effect with an 18,000-lb. per hr. capacity. And Scottish Mills Marketing Board, Glenrothes, operates a double-effect evaporator ahead of a roller dryer.

A.V.P. Co., Inc., a British heat-exchanger firm with offices in Buffalo, N. Y., engineered and built the plate evaporator and supervised its installation at Snively. Plates and other primary parts for it are manufactured in England. Auxiliary equipment is produced in the U.S.

Land O'Lakes Equipment Sales Div., Minneapolis, is distributor for the dairy field. —*End*



**HYDROSTATIC STERILIZER** is set into a 30-ft. pit to put intake and discharge at seamer conveyor level, to bring power units within easy reach, and to simplify plant construction. Pit ladders make entire unit accessible.



**EFFICIENT,** compact straight-line layout was engineered before building was erected. Floor is concrete; wall, brick; roof, corrugated metal; skylights and windows, corrugated fiberglass. Plant has spacious warehouse for lift-truck stocking and control lab.

# French Build Efficient Canneries

FE REPORTS ON EUROPE

**Hydrostatic sterilizers popular. Production flow is straight-line, machines modern, handling mechanized**

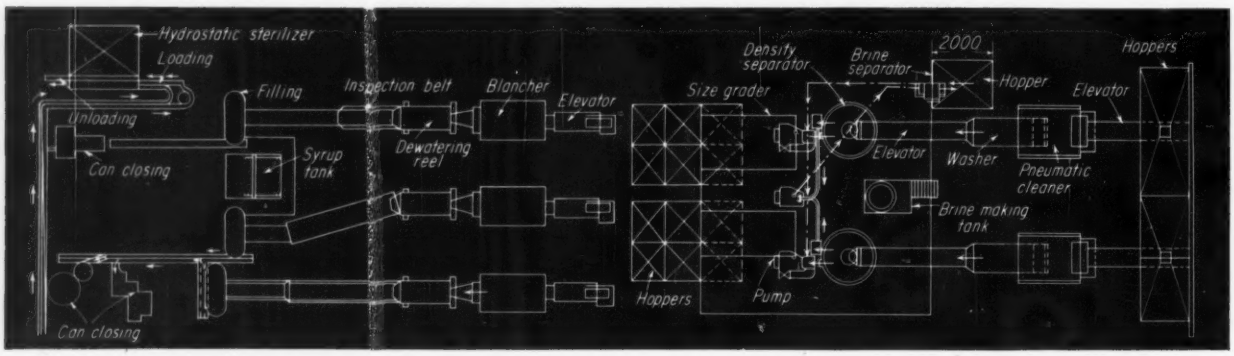
STILL A NOVELTY to U.S. food processors, the hydrostatic pressure sterilizer for food in cans was first installed in Europe in 19?0. And one equipment manufacturer alone has sold more than 50 of them, for a wide variety of products—including vegetables, milk and other dairy items, and pork and beans.

**FRANK K. LAWLER**
Editor, "Food Engineering"

Great saving in floor space, 80% reduction in steam and water costs via regenerative heating-cooling, and continuous high-capacity operation are some of the reasons for its popularity in Europe. Other factors are ability to handle different sizes of cans and bottles, constant temperature for a given hydrostatic head, and provision for changing the head to achieve different temperatures. It is significant, too, that processed cans are cool enough to be labeled when they discharge from the sterilizer.

In a modern small French pea cannery visited by the author, the hydrostatic sterilizer was the thing that most distinguished the plant from U.S. practice. But this plant, operated by Conseveries du Plessis-Belleville, is efficiently designed throughout. It is compactly arranged for straight-line process flow, and is equipped with the same types of machines found in new American pea canneries—except that there are no casers.

A Paris engineering company,




**PROCESS LINES,** from pea receiving hoppers (right) to hydrostatic sterilizer (upper left). Operations and machines are similar to modern U. S. practice. Handling is mechanized with conveyors and pumps.

Maison Frédéric Fouché, made the complete plant layout before the building was constructed. Fouché supplied the Carvallo sterilizer and all other equipment except the Angelus can seamers.

Indicative of canning progress in France is the fact that this is but one of five modern canneries designed by this engineering firm in three years.

Another point of progress is that many small canning firms have consolidated operations to improve production and distribution.

The Conserveries plant has a 10 to 15-day season. And with 90 employees it can pack 200 tons of peas a day in large containers, or 100 tons in small cans. Equipment for this capacity cost $300,000 dollars.

The plant's business is so good that it is adding another, larger, hydrostatic unit for the coming season.

No less than 10 grades of canned peas are packed in the plant, 5 of them fancy (France has five official pea grades). Conserveries uses cooked sweetened syrup in fancy grades. And it adds onions, small tomatoes, spiced carrots, and sometimes beets to please French tastes.

Quality is controlled by two chemists, who have a small well-equipped plant laboratory. And the plant manager received training at a French canning school that gives courses of 6 months to a year duration.

## Hydrostatic Sterilizer

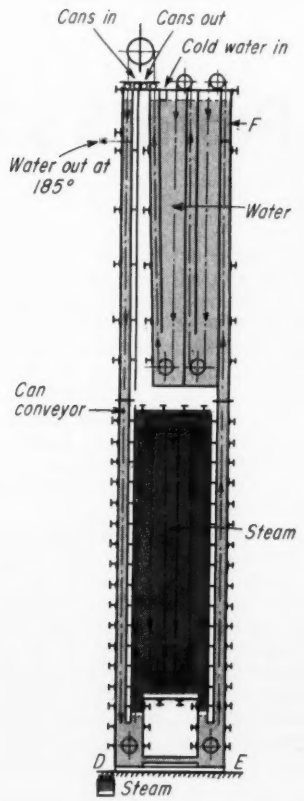
In the Carvallo hydrostatic unit, superheated steam for sterilizing canned products is confined in a chamber under the pressure of water legs (see diagram). Cans are conveyed downward through one water column and are preheated. And after going through the steam, they are carried up through the other water leg for cooling. This cycle, plus the use of a regenerative heat exchanger (diagram) to cool sterilizer water and heat water for steam generation, is economical in use of both water and steam.

Performance in terms of travel time and temperatures is indicated by the accompanying set of curves for a product packed in glass.

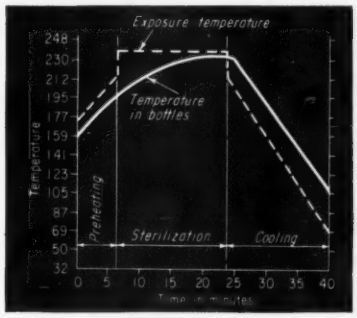
Containers are carried through the unit in long perforated metal tubes. These, in turn, are transported by arms on a twin-chain conveyor, but are not attached to the arms. The perforated tubes are loaded with several containers simultaneously by a pusher mechanism that shoves in an assembled row of containers automatically. When travel through the sterilizer is completed, the containers are plunger-pushed from the conveyor cylinder.

Different sizes of cans or glass containers can be handled in the same perforated carriers. Speed of travel can be varied for different process times by adjusting the variable-speed conveyor drive. Different steam temperatures can be had by varying the level of water in the sterilizer legs with the aid of valves. And eccentric agitation or rotation can be provided by simple devices built into the conveyor systems.

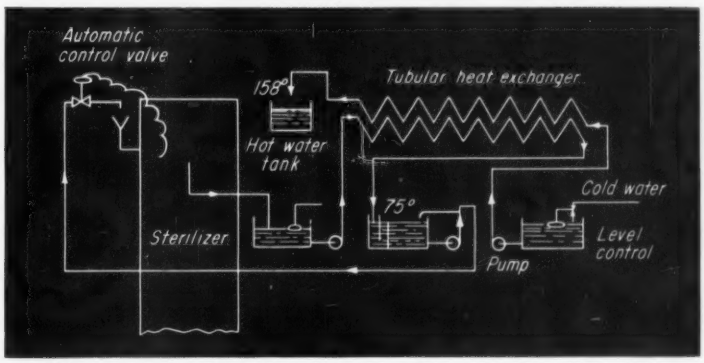
All functions of the machine are automatic, and synchronized and electrically interlocked to avoid jamming. Parts are rugged to avoid breakage and downtime. No standby sterilizers are used in two plants visited by the author. And one unit had been in operation for 5 years without major trouble. —*End*



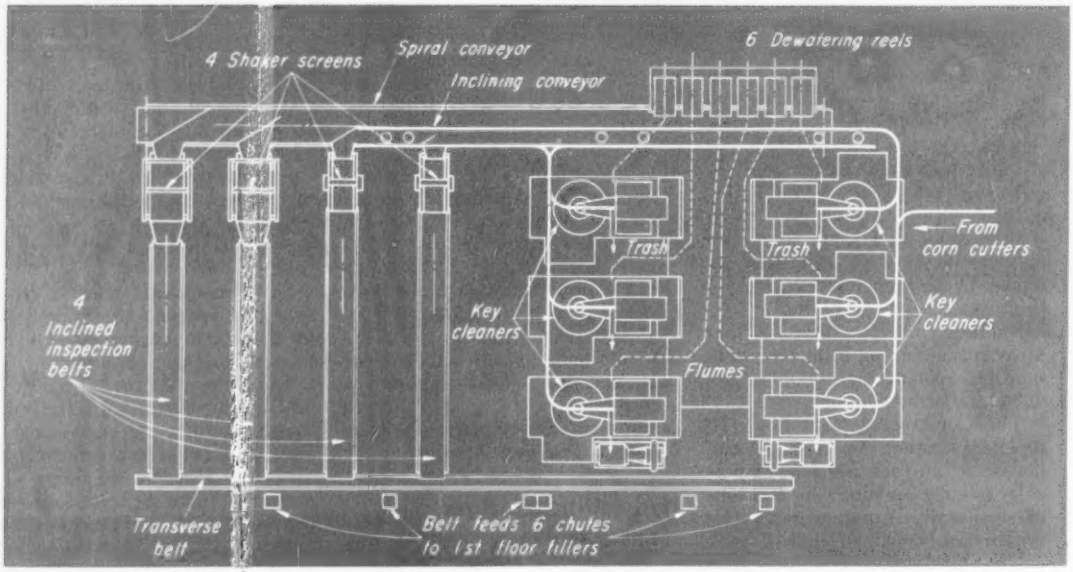

**STERILIZING STEAM** is confined in chamber under hydrostatic pressure of water in columns on either side of hydrostatic unit. Canned product is conveyed down through hot water, passes through steam chamber, then up water column at right for preliminary cooling, and into water chamber for final cooling.




**TIME-TEMPERATURE** curve for water and steam through which containers pass, and similar curve for product in glass containers.




**ECONOMY** in use of heat and water is achieved by regeneration. Hot water from sterilizer is cooled and water for steam generation heated by countercurrent flow through heat exchanger.




**IN PERFORMANCE-BOOSTING corn-cleaning system, kernels flow in from cutters to 6 flotation cleaners, 6 dewatering reels, 4 shaker screens, and 4 inclined inspection belts. Finally, transverse belt feeds quality product to 6 chutes supplying 1st-floor fillers. Layout accents top efficiency in compact setup.**

# Modernizing That Spurs Profit $$$

**"Full picture" approach pays handsomely for Midwest canner in operation-simplifying revamp . . . Accented is cost-factor planning of facilities to meet urgent demand for greater output of quality product**

GRASPING the whole picture is basic when you set about modernizing to up production performance and improve product quality.

**For much more is involved than merely stepping up physical facilities. In short, the truly effective modernization must improve your cost control factors—if profits are going to be improved.**

This overall approach was emphasized in the recent revamp at The Milford Canning Co., Milford, Ill. Here, management accented cost control aspects in shaping its new setup to reduce rejects, handle expanding production demands, lend itself to new processes, and pay back its investment on the most favorable schedule.

Concentrating on its urgent need for advanced systems, Milford increased its production facilities to a performance hailed as the largest corn-packing operation under one roof. This past season, its hourly output of cut corn at times reached a smacking 60,000 lb., near the top capacity of the plant.

In the refitting that achieved this, the company constantly probed out cost cuts in the most sensitive cost-making areas. And winning of big savings is particularly credited to installing of—

**1. Six in-line type Key flotation cleaners.** These FMC units simplified inspections on four sorting-belt systems—to the extent of reducing personnel on each line from 8 to 3. These new cleaners better the control of product quality by more efficiently removing silk, cob pieces, chaff, off-color corn, etc.

**2. Merry-go-round type conveyorized storage facilities.** These accumulate processed corn in event of any lapse or down-time on the six can-filling machines. System keeps all other equipment running smoothly abolishes former tedious handling of corn in and out of temporary storage, and eliminates spillage waste encountered in old routine.

**3. Means for conserving city-purchased water** used in corn cleaning, cooling retorted cans, and plant-cleaning operations. By reclaiming water, company has slashed seasonal usage from 11,000,000 gal. down to 4,000,000 gal. Conservation has been achieved through built-in systems of recirculating water in Key flotation cleaners, reclaiming cooling water in retort room, and using John Bean high-pressure 600-psi. jet-type cleaning equipment (FMC) for sanitizing plant areas and equipment.

**4. Electrode-type product level-measuring probes in hoppers of filling machines** to assure more accurate can fills and, thereby, reduce product give-aways and slack fills.

**5. Two can accumulating systems** (George J. Meyer) between three fill-

**S. BROWNE and J. POCIALIK**

Sales Manager, Milford Canning Co., Milford, Ill.
and
Applications Engineer, Food Machinery & Chemical Corp., Hoopeston, Ill.

ing machines and two continuous cooker-coolers (FMC). These serve to reduce downtime, can damage, and labor.

## Performance Streamlining

Now for a closeup of Milford's modernized routine for handling the big upsurge in production while also reducing manufacturing costs:

Corn is chuted from 60 3rd-floor cutters to 2nd-floor V-bottomed flumes (9x13 in.) feeding the new battery of six flotation cleaners (three on each side and staggered).

Each cleaner consists of three reverse-spiral reels and a double-coned flotation chamber. Top reel separates water and cob pieces from cut corn, which is funneled into flotation chamber. Cobs are chuted into the 2nd reel for waste recovery, and other foreign matter separated in flotation chamber is floated off and piped to waste recovery reel. Cleaned corn is pumped (15 hp.) to 3rd reel, then flumed to six side-by-side reels for final cleaning.

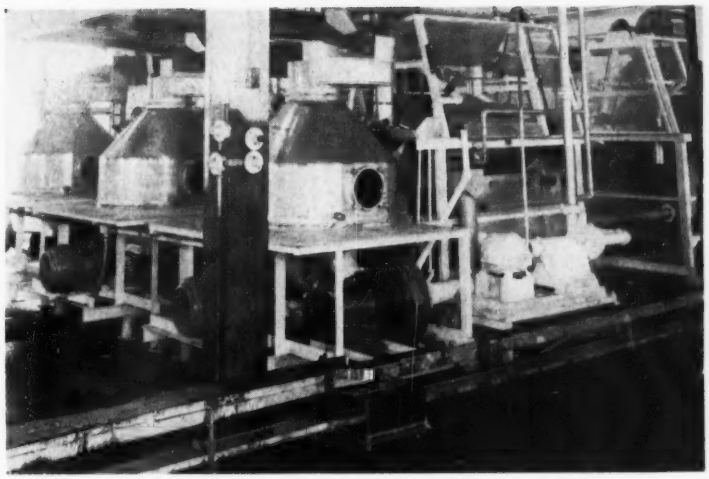
From latter reels, corn discharges to transfer-inspection belt (1½x60 ft.) feeding four shaker-type screens (Link-Belt and the United Co.). Meanwhile, flume water (270 gpm.) is recovered in 125-gal. tanks hooked to each cleaner and interconnected through 4-in. headers. Two 3-hp. pumps return water to flume system.

Continuing with the corn: From shaker screens, kernels proceed along four inclined inspection belts (2x15 ft.) and are discharged onto a rubber-belt conveyor (1x60 ft.). They then chute into cone-bottomed bins (30-in. dia. by 5 ft.) supplying vibrating units (1x5-ft.) that in turn feed bowls of two 6-pocket and four 8-pocket fillers on the 1st floor.

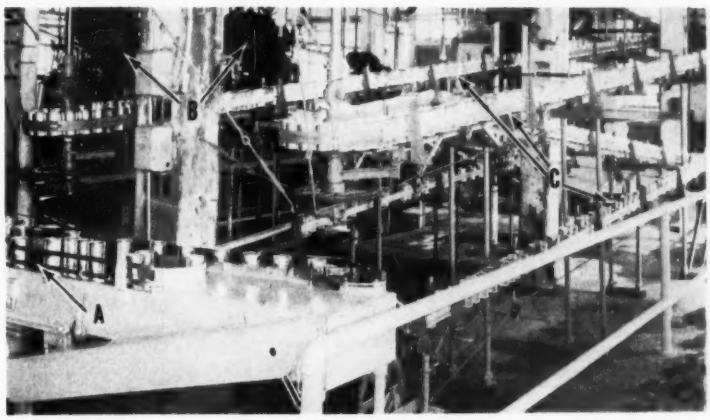
In event of downtime on a filling machine when supply bins are full, the new merry-go-round conveyor system serves for in-process storage. It consists of a 30-in.-wide belt with 15-in. sides and transfer conveyors attached to parallel 1x60-ft. belt feeding bins. In-process storage belt travels at 12 fpm., while hopper supply belt moves at 200 fpm.

## Better Can Fills

With the cooperation of FMC engineers Milford devised its floatless, electrode-type product measurement system for filler hoppers. Eliminating the costly headaches of inaccurate can fills, this level-control operates on the principle of electrolytic conductivity of corn. By maintaining constant head in hopper of filling machines, it's cut down product give-aways as well as slack fills.



**BATTERY of 6 Key cleaners paces cut-corn operation that's chalked up striking 60,000 lb./hr. Efficiently removing foreign matter, units do double job of "upping" quality and "downing" number of workers needed for inspection.**




**FOR UNINTERRUPTED feeding of continuous cooker-coolers, accumulator (A) takes cans of corn from fillers (B) and transfers them onto triple-loop cable conveyors (C). System saves labor, cuts downtime.**

**Former drained weights varied ¼ to 5/16 oz.—but with the new level-control, variations have been reduced to 15/100 oz.**

Details of new method: Low voltage current flows between hopper wall and insulated electrodes (spaced about ¾ in. apart) as long as latter are covered by corn. But when corn level drops below lower electrode, circuit is interrupted, de-energizing relay contact and thus triggering delivery of more corn into hopper via vibrator feeder until level rises to upper electrode. At this point, a second relay's contact is energized (as first relay's contact is closed) to stop flow into hopper.

The new can-accumulating setup keeps continuous cooker-coolers filled to top capacity while eliminating labor formerly required by crate-type retorting. System consists of a common belt (1¼x30 ft.) collecting sealed cans from three 8-station fillers (FMC), 2x12-ft. flat-top chain conveyor (Meyer accumulator), and two cable conveyors feeding two continuous cookers. Cable conveyors make three loops for total 100-ft. travel, and they handle 200 and 250 cpm.

—*End*

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CIRCLE 68 ON READER SERVICE CARD

CIRCLE 69 ON READER SERVICE CARD→

# "Knox furnishes us the packages that sell," say executives of major olive and pickle packer

"When packed in glass, stuffed olives—with their eye-catching colors—are a real stop signal to grocery store shoppers," says the manager of the olive department of one of America's leading food packers,* a major user of Knox glass.

"In our olive department, for example, 85% of the glass jars we use—in nine different sizes—are Knox products.

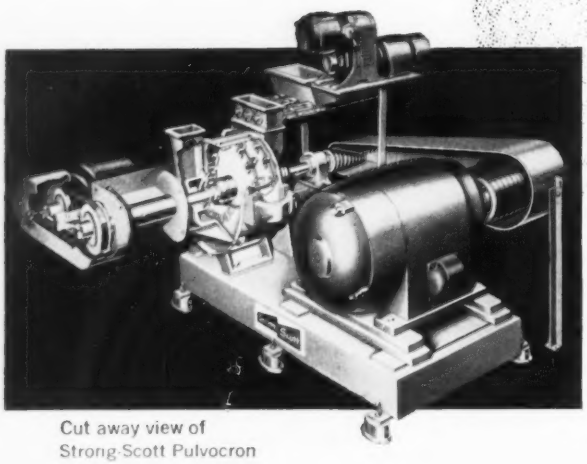
"We take full advantage of Knox's quality and clarity by hand-packing our olives in patterns that give maximum package attractiveness. We've found that this, plus proper display in the store, can increase a grocer's olive sales by ten to fifteen percent."

*Name available on request.

The manager of the same company's pickle department says: "In modern supermarkets, the product has to sell itself. That's why we use glass—to take advantage of impulse buying. Knox's quality glass can take the strain of the packing process—including the thermal shock of pasteurizing—and still give us the best available sales package."

Find out how Knox's quality product, reliable delivery, and outstanding service can play an important role in increasing your sales by furnishing the package with maximum shelf-impact. Contact Knox Glass, Inc., Knox, Pa., or any one of Knox's 37 sales offices.

*the new*/**KNOX GLASS**



Cut away view of
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The Pulvocron is now being used to solve many size reduction problems in the chemical, food and related process industries. Available in 20 and 38-inch grinding chambers and constructed of carbon or stainless steel.

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- **Pulverized product temperature control**
- **Installation versatility**
- **Accessibility for inspection**
- **Sturdy construction for years of service**

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## TYPICAL INSTALLATIONS USING 20″ PULVOCRON

| | |
|---|---|
| Product . . . . | Soya Sitosterols |
| Feed Material . | 40 Mesh (Approx.) |
| Pulverized . . . | 99.99% minus 10 microns |
| Capacity. . . . | 500 lbs. per hr. |

| | |
|---|---|
| Product . . . . | Urea Formaldehyde |
| Feed Material . | ¼ to ⅜″ Diameter |
| Pulverized . . . | 99% minus 80 Mesh |
| Capacity. . . . | 1600 lbs. per hr. |

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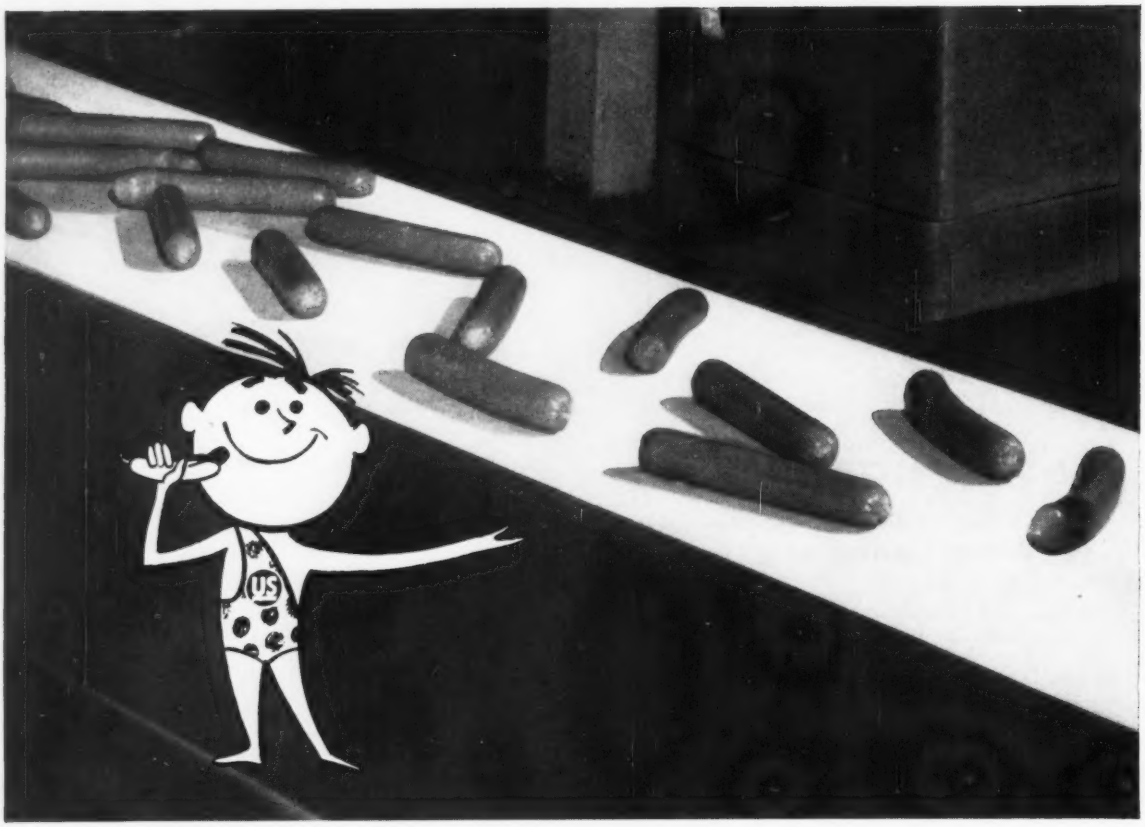
LITTLE GIANT CONVEYOR BELTS



# FOR OVER 4 YEARS U. S. Little Giant Conveyor Belts have been working at Wilson & Co.

At the Albert Lea, Minn. plant of Wilson & Co., this U. S. Little Giant® Belt has been carrying franks from the skinless frank peeling machine to the packing personnel, and the packaged products to the boxing station.

Says Leo E. O'Neal, plant superintendent: "The wieners have to be handled gently. In 4 years' service, U.S. Little Giant Conveyor Belt has behaved perfectly. No repairs have ever been needed—therefore no downtime. The belt is easy to keep clean, needs minimum maintenance and is reasonable in cost. Shipping and processing costs are a major production charge in a packing plant. This belt has cut these costs downward. The belt is safer than metal—there are no openings for personnel to get their fingers into."

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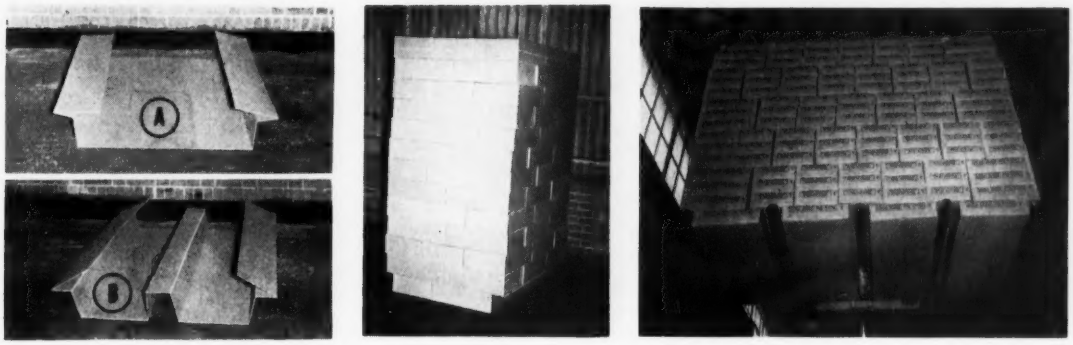
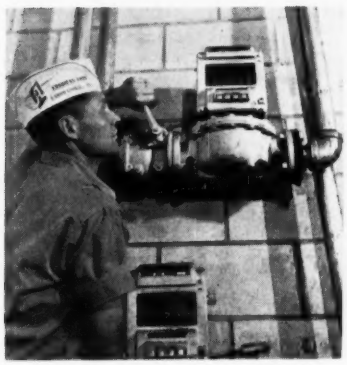



## "Wrappers" Speed Palletless Handling

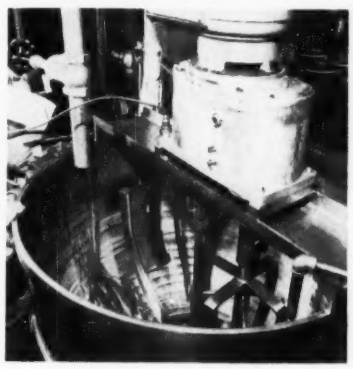
For unitized shipments of sealed, unsealed or small cartons, or trays, where "flap" palletizing (FE June '59, p. 106) isn't feasible, the new "wrapper" method provides economical and speedy handling.

Employed are specially scored sheets of paperboard (left photos) which are folded around base cartons to provide a lifting medium. Wrapper (A), for small loads (center) handled with 2-fork truck. Wrapper (B) may also be used for half truck width loads to be handled by lift trucks equipped with 3 forks, or for full truck width loads (right) to be moved by lift trucks having 5 special forks.

Where counterbalanced fork lift truck is available, special forks can be supplied by truck manufacturer, or built in plant machine shop for less than $500. Revamped truck is compatible with regular pallet system—2 or 3 fork unit can be used to handle standard pallets, and 5-fork truck to handle 2 small pallets, side-by-side.—*J. F. Brown, Materials Handling Supervisor, Anchor Hocking Glass Co., Lancaster, Ohio.*



Automatic metering now puts . . .



. . . precise amounts in mixing vats

## Switch to Bulk Pays Off First Year

Back in 1958, American Food Laboratories, Brooklyn, N.Y., was buying glycerine and propylene glycol in 55-gal. drums. But then analysis of its specific setup revealed that bulk handling promised significant savings:

An investment of $10,000 in two 3,000-gal. stainless tanks plus a piping system could, it was indicated, be retired in a mere 2 yr.

The company went ahead—and there was proof of the accuracy of its decision in but 1 yr. First off, operating data showed savings of about $4,000 annually through buying glycerine and propylene glycol in large lots.

Second, another $1,000 a year was conserved by abolishing the old tedious manual handling of drums, saving the space formerly needed for their warehousing, and avoiding spillage and similar losses incurred when measuring out and transporting materials.

Moreover, President David Glaubman cites the new system as being instrumental in enabling economical production of I.L.S., the firm's new fully emulsified liquid stabilizer.

A cooperative role in the installation was played by The Dow Chemical Co., which aided with design and technical "tailoring" of the system and also supplied advice on the special packings required for the piping.

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New pressure controls . . . 0.5 to 150 psig.

# Diaphragm Pressure Regulators

. . . with PLUS-PERFORMANCE FEATURES

Now . . . Robertshaw engineers answer still more of your pressure control problems with these highly efficient diaphragm-actuated companions to our famous *bellows* self-ops!

Ruggedly built and modestly priced, this new 1065 Series is offered in four diaphragm sizes, with nine different ranges from 0.5 to 150 psig. Single-seated ½" to 2" valves for positive shut-off . . . piston-balanced in the larger sizes; double-seated, 2½" to 4" sizes.

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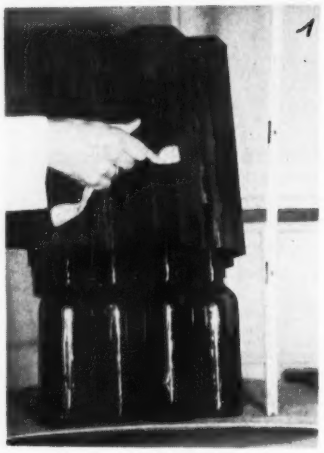
- **Spring-loaded Teflon chevron lifetime packing**
- **Ball-bearing wheel adjustment**
- **Quick-disconnect, polished monel valve stem**
- **Stainless steel trim standard**
- **Highest quality chrome steel adjusting spring**
- **Valve designs backed by years of field service**

For complete specifications, ask for Bulletin **EG-125. Fulton Sylphon Division, Robertshaw-Fulton Controls Company, Knoxville 1, Tennessee.**

Robertshaw

MR CONTROLS

*Practical Ideas*



## "Honeycomb" Bottle Handler

We formerly handled our 0.6 liter bottles individually, a slow, tedious method which sometimes resulted in breakage.

To speed this operation we developed the "honeycomb" bottle handler (photos).

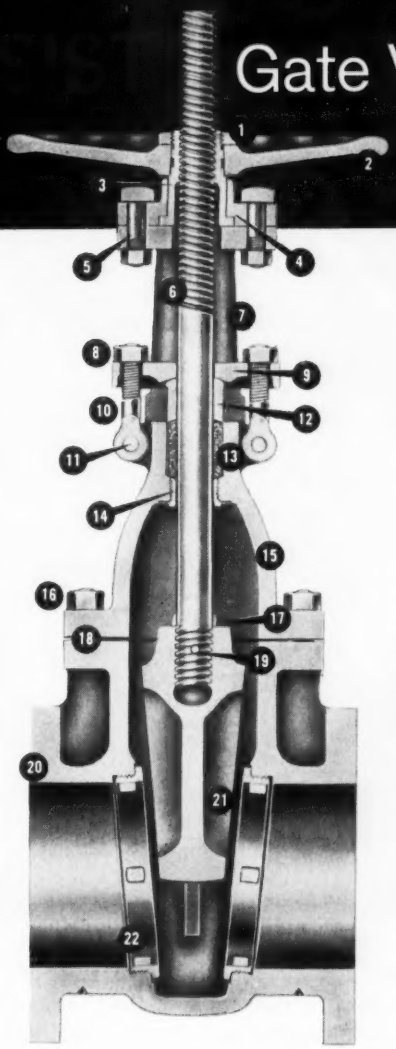
By slipping the handler over a 20-bottle group and upending by sliding the load off rounded edge of table, one man can handle the entire package.

Container is fabricated of hard polyethylene. Handles, of unperishable textile band, are riveted to it.—*Herm Martin Hurlimann, Brauerei A. Hurlimann, Zurich, Switzerland.*

## Thumbs Down, Safety Up

It's human for an adult to resent repetitive warnings that he's committing an unsafe act. In most instances, he may be aware of the danger but, either through thought-

# You extend valve life in Corrosive and Erosive services TWO WAYS when you Specify for Gate Valves, too




**No. 1**... when you specify "Jenkins" you get not merely "Ni-Resist" metal but you get Type 2 Ni-Resist Cast Iron! That affords extra resistance to acids, salt and alkaline solutions, sea water, brine and other corrosive and erosive fluids, vapors or gases. It is copper-free and will not contaminate or discolor the materials controlled.

Type 316 Stainless Steel is used for the wedge, spindle and other trimmings to give you a combination of metals which have remarkable ability to withstand destructive service.

**No. 2**... you get all the excellence which the Jenkins Diamond trademark has represented for nearly a century. The superior design and construction are visible here. Equally important superiorities which show up only in the records of long service and low maintenance are the close grain and high density of Jenkins castings ... the precision of Jenkins machining ... the rigid inspection and testing which every Diamond-marked valve undergoes.

It costs no more to buy Ni-Resist Gates made by Jenkins. And, it may cost much less to USE them. Write us, or ask your Jenkins Distributor for information folder No. 205.

1 Bronze yoke bushing nut
2 Handy grip iron wheel
3 Bronze yoke bushing
4 Iron yoke cap with zerk fitting for lubricating bushing
5 Steel yoke cap bolts and nuts
6 TYPE 316 STAINLESS STEEL spindle
7 NI-RESIST CAST IRON, TYPE 2, yoke
8 Bronze eye bolt nuts
9 Malleable iron gland flange
10 Steel gland eye bolts
11 Steel gland lug bolts and nuts
12 TYPE 316 STAINLESS STEEL gland
13 Teflon impregnated asbestos packing
14 TYPE 316 STAINLESS STEEL bonnet bushing
15 NI-RESIST CAST IRON, TYPE 2, bonnet
16 Steel bonnet bolts and nuts
17 TYPE 316 STAINLESS STEEL spindle ring
18 Asbestos gasket
19 TYPE 316 STAINLESS STEEL wedge pin
20 NI-RESIST CAST IRON, TYPE 2, through-port body
21 TYPE 316 STAINLESS STEEL solid I-beam wedge
22 TYPE 316 STAINLESS STEEL seat rings

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# USE THESE NEW SMOKED YEASTS FROM VICO . . . .

***Give a sweet, natural hickory smoke flavor to canned, baked, frozen foods—perfect as a masking flavor for pet foods, pharmaceuticals, other specialties.***

Both Hickory Smoked Brewers' Yeast and Hickory Smoked Torula Yeast have been added to our line of KATER brand hickory smoked products. Both the Brewers' Yeast and the Torula Yeast are *naturally* hickory smoked to a high flavor level, yet they cost less than ordinary smoked yeasts.

High in protein, non-fermentable and highly palatable, they give a delicious, meaty smoked flavor to other foods.

KATER Hickory Smoked Yeasts, dried at temperatures above pasteurization, are acceptable under all regulations of the U.S. Food, Drug and Cosmetic Act, as amended. Approved for certain applications in federally inspected meat plants.

Smoked-flavored food products are big business—get your share! If you process canned meats, soups, stews, sauces, baked goods, prepared mixes, dressings, frozen pre-cooked or prepared foods, pharmaceutical, pet foods, or other specialties, ***WRITE FOR FREE SAMPLE ON YOUR LETTERHEAD.***

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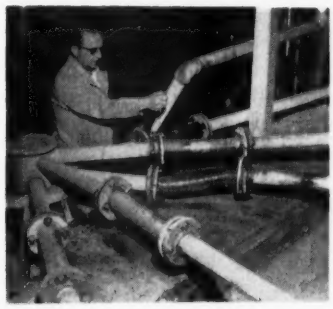
## *Practical Ideas*

lessness or foolhardiness, he deliberately jeopardizes his safety.

To avoid hurt feelings, Gerber Products Co., Rochester, N. Y., resorts to sign language. In short, employees use the thumbs-down sign to tip off fellow workers that they're doing something that's an unsafe practice.

Thus, the admonition isn't heard —usually is seen only by the one in danger. This relieves the embarrassment of others overhearing. A friendly method between employees of equal position, it gives each the opportunity to participate actively in tactfully communicating safety procedures.

This "Thumbs-Down Campaign" is creating an increased worker interest in safety measures. — *Gerber Products Co.'s "Gerber News".*



### Flex-Hose Improves Flow

To absorb pipe vibrations of finishers and other units, wine-type hose with brass couplings was originally used to carry 200 F. tomato products at Frank M. Wilson Co., Stockton, Calif.

But there was a difficulty. In operation continuously 60-days a year, these lines were subjected to tomato acids, also alkaline detergent used for sanitation. Result: Hose connections couldn't be kept tight—sucked air, posed a sanitation problem, slowed down pump action, and retarded process.

Original hose and couplings were replaced with Flexseal Connectors. Made by B. F. Goodrich Co., Akron, Ohio, these rubber vibration-cushioning units are tasteless and odorless. They have flanged hose-ends which are bolted into the pipe to form a tight seal.

This new system obviates air incorporation and improves sanitation. It has been in use for 2-yr. and has an expected remaining life of about 5-yr.


For Limited Space

Specify New Viking "Sanitor" Pumps with handy opposite ports

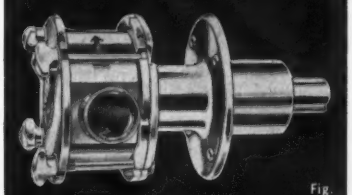


Fig. 8171A

Yes, Viking "Sanitor" pumps are now available with handy opposite ports in 35 and 50 GPM sizes. They're specially designed to fit compact bulk milk trucks and other sanitary installations where space is at a premium.

In addition, you have a pump with positive discharge and smooth, even flow. You can't beat the "Sanitor" for easy disassembling. You can do it in less than a minute. No tools are needed. You have no threads, bolts, deep O-ring grooves or splines in the pumping zone for hard cleaning.

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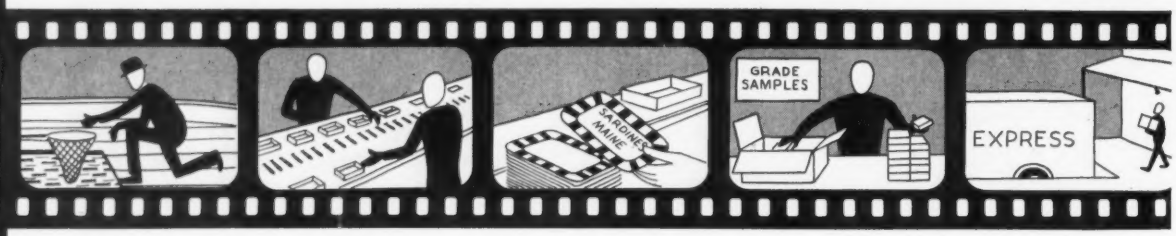
## 10 Steps in Maine's High-Performance Grading




State inspectors check every boat load.

Workers concentrate on better grade packing.

At intervals, inspector inserts special lids in closing line . . .

. . . that identify the sample cans, which are . . .

. . . rushed to the grading lab by fastest possible means.

# Sardine Canners' Program

**Maine processors tax themselves to finance QC and inspection service, adopt mandatory grading that all but eliminates sub-standard product . . . Project spotlights "how-to" for other branches of industry**

THEY'RE LITERALLY pulling themselves up "by their boot straps."

That, in a nutshell, is the story of the Maine Sardine Industry, a group teaming 25 independent companies that operate 35 small plants along 200 miles of the state's coast line.

This specialized segment of the food industry, which had progressed very little quality-wise for 80 yr., voluntarily set up and financed a program that has, within the last 5 yr., greatly improved the quality of its product—Maine sardines.

And although much remains to be done, results to date indicate outstanding progress. Of the 1959 pack, less than 0.5% graded below Standard, compared with 10% of the '57 pack.

Even more significant are improvements within the acceptable grades—Standard, Extra Standard, and Fancy. In 1957, slightly more than 67% rated as Extra Standard and Fancy. But in '59 pack, 86% achieved these categories.

Alarmed back in '51 by the fact that sales of Maine sardines hadn't kept pace with population growth, representatives of the canners appealed for state enabling laws to: (1) Launch an advertising, merchandising and development program, and (2) legalize a 25c/case privileges tax on canners to support the program. This action aimed to insure 100% participation and cooperation.

Virtually all of the canners label their products "Maine Sardines" or "Sardines From Maine," regardless of brand name used by individual canners. And there is little consumer preference as to brands, with price being the most important factor.

Desired legislation was enacted in Feb. 1951, making it possible to collect the tax on that season's pack. This levy has produced approximately $\frac{1}{2}$ million each year since.

Initial purpose was to provide funds to promote Maine Sardines through advertising. However, the enabling act also included provisions permitting outlays for product improvement and research.

The bill further provided that a 7-man council comprised of active canners be appointed by the State Commissioner of Sea & Shore Fisheries to administer the fund. Offices were opened, a director hired, and after a few months of research and study, it became evident that the most urgent problem was to raise quality of the packs.

To do this required both means and a method. Means necessitated authority to grade the products mandatorially. Method required the setting up of equitable standards.

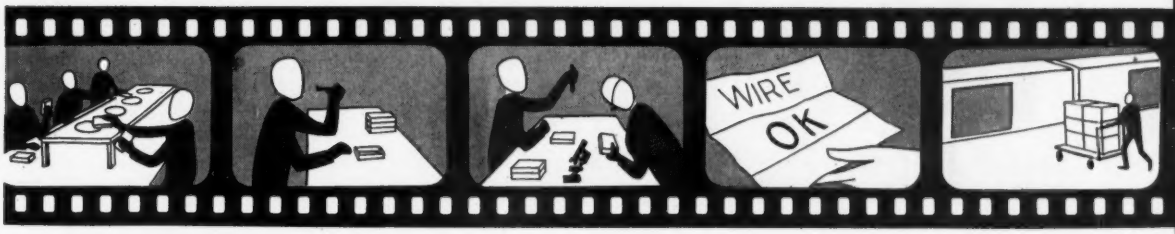
### Inspection Service Launched

Logical agency to administer the QC program was the State Inspection Service of the Department of Agriculture. So, with its full cooperation, additional legislation was obtained to. (1) Permit promulgation of standards; (2) authorize mandatory grading, and (3) establish the Maine Sardine Industry Board as an official channel to the office of the Commissioner of Agriculture.

Having established the means, the more difficult problem of perfecting the method was still to be solved. The committee members agreed that "Consumer Expectancy" should be the basis for these standards. Drawing on their own canning experience, they came up with values for scoring the packed products. These were: Appearance, 45 points; Flavor, 30 points; Odor, 15 points; and Texture, 10 points.

In addition a consumer opinion study was conducted by the Market Research Dept. of Batten, Barton, Durstine & Osborn. Object was to obtain a true national cross-section.

**ARTHUR V. GEMMILL**
Senior Associate Editor, "Food Engineering"




Every lot is graded by State Officials who perform . . .

. . . meticulous checks for taste, flavor, and . . .

. . . appearance, texture, salt, and moisture.

Grading results are sped to the canner, and . . .

. . . the pack is released for shipment to distributors.

# Hits Top-Quality Bull's-Eye

And results of this study confirmed correctness of the above values.

But the problem of setting up actual standards for testing the product was yet to be resolved. This was tackled jointly by the Industry QC Committee, U.S. Fish & Wildlife Service, and a technologist with extensive experience in salmon canning.

Their work brought the tentative standards that were used for voluntary inspections of about 85% of the 1955, '56, and '57 packs. Focused on packing operations needing improvement, these inspections uncovered technical problems requiring research studies.

At the end of the '57 season, the packers voted to accept the standards and make mandatory the grading of all ¼-size oil-pack sardines. In '59 ¼-size mustard and ¾ oil packs were included, and this year the ¾ mustard and 15-oz. oval oils are to be covered. This brings almost the entire pack under mandatory inspection.

## Research Program

Early in 1954, research was inaugurated aiming to develop basic data on sardine-canning technology, along with a grading procedure. Then in December of that year, a research director was hired—Berton S. Clark, Past National President of IFT.

His first assignment was to set up a laboratory with a staff to quality-grade the sardines packed in 1955.

The lab was first established at the U. of Maine. In 1957, however, it was moved to a modern 3-story facility in Bangor. Equipped for fast, efficient service, this laboratory employs more than 40 people during the peak of the canning season, and it costs about $150,000 per year to operate.

During the '58 season, some 80,000 samples of ¼ oil pack were graded. This represented 1,692,908 cases (100 cans each) of product. In '59, more than 115,000 samples of all types and sizes were graded.

Initial rules recognized three acceptable grades: Fancy (score 85-100), Extra Standard (70-84), and Standard (60-69). Quality below standard (score under 60) was classed "No-Grade." This latter product wasn't unwholesome food. Rather, it was product that was highly unattractive in appearance—due primarily to poor workmanship in the cannery. This could readily be improved by the packer.

The subsequent mandatory program defined 5 grades: Fancy, Extra Standard, Standard, Substandard, and No Grade. Lots classified Substandard must be prominently labeled, and "No-Grade" products cannot be sold as sardines.

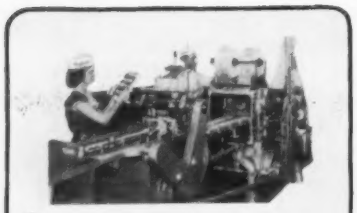
## Sampling Procedure

For the first three years, sample sizes were varied according to size of lots—10 cans from 500 cases, 20 from 500-1,000 cases, 30 from 1,000-2,000, and 40 from larger lots.

In 1958, however, the plan was re-evaluated to grapple with these questions: (1) How large a sample can the lab process economically? (2) how great an accuracy is required?, and (3) how much risk can be taken?

*Continued on next page*

**VISUAL INSPECTION** is prime grading step. Points are deducted for such defects as flesh cracks, ragged or angular head and tail cuts, improper dovetailing.



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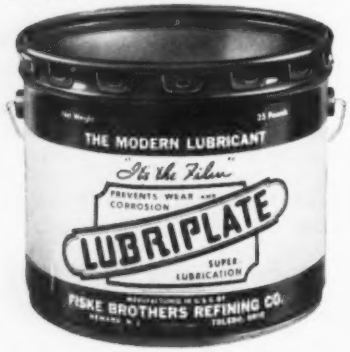


TV GAVE project an eye when Hazel Williams, taster at Sardine Council lab, appeared on John Daly's "What's My Line."

The statistical division of the National Canners Assn. was very helpful in resolving these problems.

Based on the above, and the laws of probability, a 15-can sample was considered ample, hence was used for all lots tested in '58. But experience during that season raised some questions as to its fairness to the packers.

So the following revision was made in '59: In event one or more substandard cans are found in the original 15, an additional 30 will be taken from the same lot and graded. If not more than 2 substandard cans are found in the 45, lot is passed; but it can never be graded above extra standard.

If more than 2 substandard cans are found, an additional 45 are graded. Finding 6 or more substandard cans out of the total of 90 causes lot to be classed substandard.

For maximum reliability in random sampling, this procedure was established:

1. Lithographed can lids of distinctive design are distributed in bundles of 15 to state inspectors stationed at the various plants.

2. Inspectors insert these lids, one at a time at intervals, in feed of sealing machine during canning of a particular lot.

3. The distinctive cans are retrieved after processing and immediately forwarded to the Bangor lab by fastest means.

Entire lot is officially restrained until grade has been established.

## Grading the Samples

On arrival at the lab, cans are checked relative to external damage, evidence of defective processing, and correctness of their code numbers. Then each lot is prepared for grading. First step is determining condition of cans (whether 'flipper,' 'swell,' or normal). Next, they're checked for gross weight, then opened, and the lids placed on a grading screen to drain. Examination for odor follows for testing this scale:

A. Normal odor—13-15 points.

B. Reasonably normal — 10-12 points.

C. Objectionable, rancid, foreign, acrid, strong, or unusual—0. These can't be graded above substandard.

Fish are examined for defects that are displeasing to the eye. Then they are emptied onto grading screen and the cans inverted at a 45 deg. angle. After a 3-min. draining period, the oil, water, and drained weights are determined.

Grader now ascertains taste score as follows:

A. Normal for type of pack—27-30 points.

B. Slightly lacking or faint taste—24-26 points.

C. Strong objectionable, such as rancid, foreign, acrid, or unusual—0. These can't be scored above sub-

standard. However, even such a score must be earned as the result of more than one taster's opinion.

An additional factor in the flavor score is salt content. If average of a lot is above 3% or below 0.75%, product can't be scored above standard. And if it is high enough to make product distasteful, it can't be graded above substandard on taste.

Final step is determining texture.

After data for all samples have been recorded, final score is computed and scores assigned to each can, and to the entire lot. When lot scores standard or above, inspector at plant is notified by teletype and lot is released for shipment. Lots falling below standard grade are embargoed until they are relabeled or otherwise disposed of.

### It's Now Time to Promote

Having obtained higher quality in the oil pack, future efforts will be concentrated on its further improvement, and on the mustard type. The lab had initial difficulty in setting standards for the latter due to color variations and other factors. So until '59, it wasn't included in either the voluntary or mandatory program.

Now that quality is assured, and the inspection setup perfected, promotion is getting under way. Presently, it's keyed to the QC story and upgrading of the product.

Early this year, Hazel Williams, a sardine taster at the lab, appeared on the network TV program, "What's My Line"—where she emphasized her role in the grading process. And in February, she and her daughter toured the country making personal appearances on local radio and TV programs.

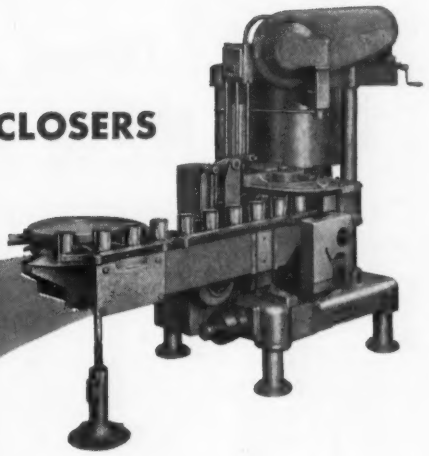
An educational film strip—accenting the importance that Maine places on sardine processing and showing methods of catching, canning, and inspection—will soon be released to social science classes of grade schools. Similarly, the story is being told in cartoon books for younger children. These will go to schools, groceries, and other outlets.

Further, the Council has engaged an outstanding home economist to conduct a school lunch program. She's presently active in the various New England states.

Later this year, yellow slicker raincoats will be marketed as the official raincoat of the Maine Sardine Fleet. Packaged with each coat will be a certificate making the wearer an honorary "Play-Mate of the Fleet."

—*End*


ANGELUS CAN CLOSERS



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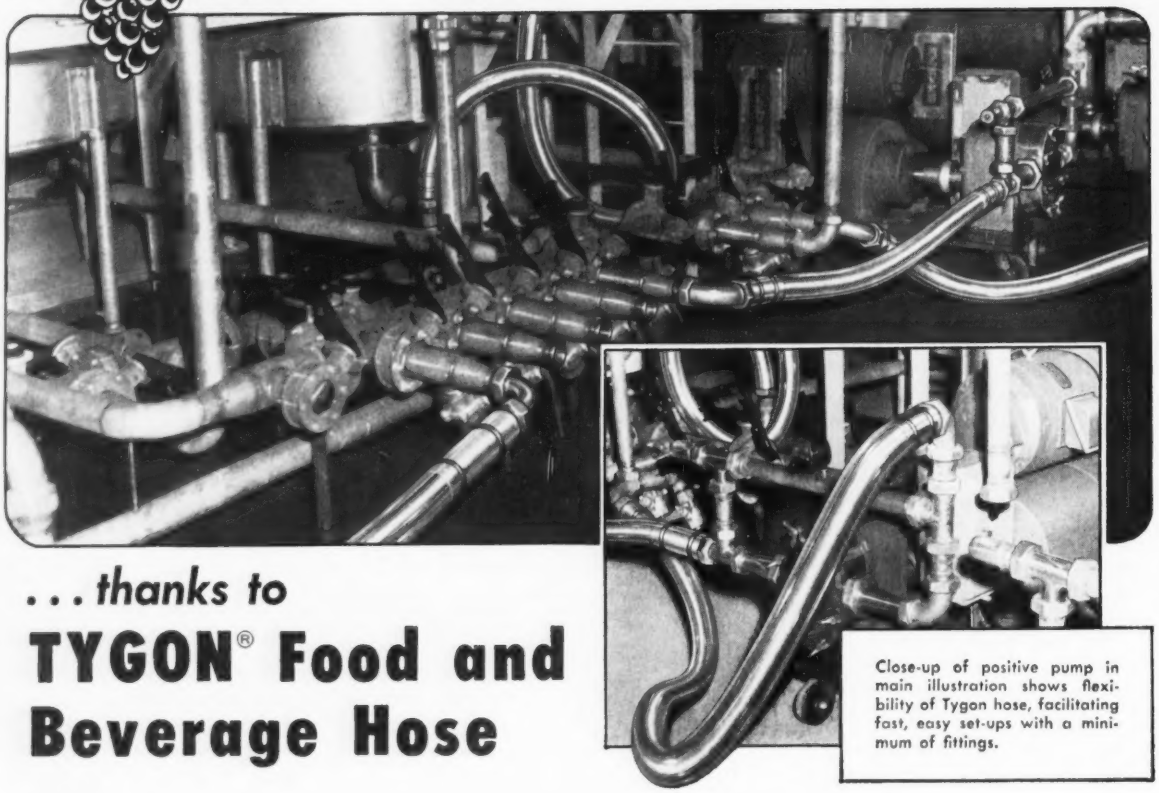
## *Grape Juice Processor finds*

# NEW WAYS TO CUT COSTS



## *. . . thanks to*

# TYGON® Food and Beverage Hose

Close-up of positive pump in main illustration shows flexibility of Tygon hose, facilitating fast, easy set-ups with a minimum of fittings.

Glass-clear, flexible, non-toxic Tygon Food and Beverage Hose (Formulation B44-3) has reduced costs for canners, packers and bottlers of all sizes. In addition to conventional applications, The A. F. Murch Company, Paw Paw, Michigan, processor of grape juice concentrate, has used Tygon's unique combination of advantages in unusual ways to get even greater savings.

For example, alert Murch production men took advantage of Tygon's flexibility and ease of coupling to put wheeled platforms under the positive pumps used to transfer juice between process equipment and storage tanks. Now, with Tygon Food and Beverage Hose on both vacuum and discharge sides of the pumps, change-over is a quick and easy process of uncoupling Tygon lines, rolling the pump a short distance and re-coupling Tygon to the proper fittings. Time required? Much less than with rigid pipe. Added benefits: fewer pumps needed, and visual inspection and control of flow afforded by Tygon's clarity.

Wherever liquid or semi-liquid foods or beverages are transmitted, chances are that Tygon Food and Beverage Hose, Formulation B44-3*, can handle the job more conveniently and at lower cost.

**For processed milk and milk products use Formulation B 44-4.*

86-G

*PLASTICS AND SYNTHETICS DIVISION*

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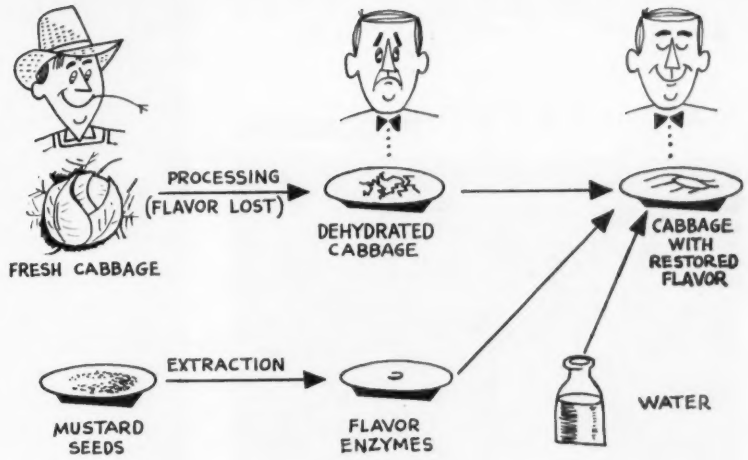
Why not investigate the advantages of using Tygon in your plant? Write today for free illustrated 28-page Bulletin T-100.




**CABBAGE APPLICATION** shows steps. Here, enzymes provided by related mustard seeds add back the fresh flavor lost in dehydration.

# Fresh Flavors Now 'Enzymed In'

**See variety of applications for new "missing link" process that restores natural taste and aroma in many canned, dehydrated, and frozen foods**

GARDEN-FRESH taste and aroma can now be assured in many canned, dehydrated, and frozen foods through use of a restorative process that regenerates the natural flavors.

**This latest effort to keep taste appeal on a par with modern convenience attractions is based on the concept that fresh flavor is produced by action of specific enzymes on natural chemical compounds called "flavor precursors."**

Usual processing methods inactivate substantially all of the enzymes present in a food product, including many of those responsible for flavor. However, the flavor precursors are more stable and can regenerate fresh flavor if the enzymes are restored.

Now, in a recently-patented process, Evans Research & Development Corp., N.Y.C., has extracted and test-proved various "flavorese" enzymes which, when added to the processed food, can reactivate the precursors to enhance natural flavor.

According to Evans, these flavorese enzymes can be obtained either from the fresh material before processing or from a biologically related source.

Researchers investigated many different foods to develop the process invention. Included was watercress. Here, fresh material was blanched in steam and dehydrated in an oven at about 150F. for 2 hr. The dehydrated product was flavorless, lacking the characteristic bite and aroma. And on adding water, the material "smelled and tasted like hay."

However, when a white mustard-seed enzyme preparation was added (from the same Brassica family), the typical odor and taste of the cress was quickly regained.

In impartially observed test demonstrations before government and industrial officials, Evans scientists used commercially processed dehydrated, canned, and frozen foods. Among these were dehydrated cabbage, carrots, and onions; canned peas and tomato juice; and frozen, canned, and powdered orange and lemon juice.

**Comparing treated vs. untreated samples in a series of 242 judgments, differences were noted in 92.2% of the cases. Treated samples were preferred 84.3% of the time as against 7.9% for the untreated. Grading the favorable ratings, preferences ran: 14.1% slight; 41.3% distinct; 18.6% strong; and 10.3% very strong.**

**Considerable variations were evident for different materials. However, treated cabbage, onions, watercress, and horseradish won 100% preference.**

## Working Points

In general, enzyme production consists of an extraction and a precipitation. The final enzyme (which is most convenient as a solid) should have adequate stability.

One of several Evans examples is the preparation of tomato enzymes: Here, three sliced tomatoes are finely blended with 200 ml. of water and cooled with $CO_2$. The slurry is filtered through cheesecloth, well chilled, and added to an equal volume of acetone prechilled with solid $CO_2$. This mixture is centrifuged at 2,000 rpm. for 5 min. and the supernatant discarded. Centrifugate is redissolved in ice-cold water, precipitated, and vacuum dried in a prechilled dessicator.

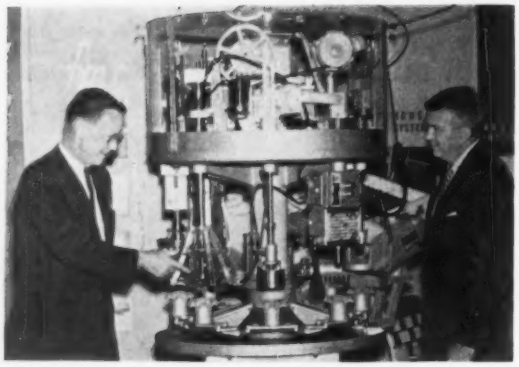
This particular method was also used for preparing enzymes of onion, pea, strawberry, celery, parsley, leek, spinach, orange, white mustard, cabbage seed, watercress, and fresh milk. Other methods of extraction include alcohol precipitation, low-temperature evaporation, freeze drying, and salt precipitation.

**In commercial food applications, the enzymes might be added in actual processing, in packaging, or in the form of a concentrate.**

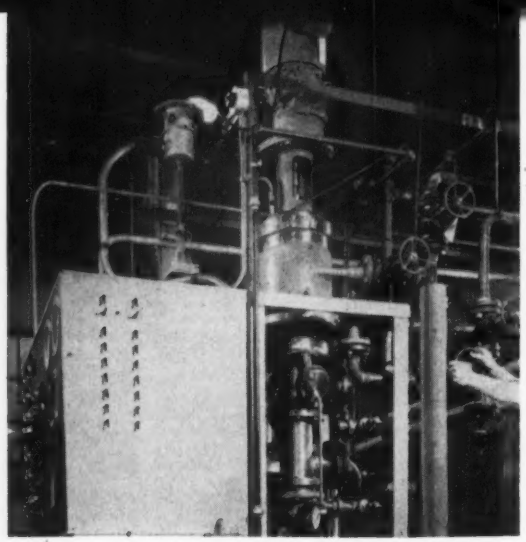
Additional research is being conducted in this area. And a further development may be use of waste plant material as enzyme sources.

**A particular possibility is utilization of the process for improving irradiated foods.**

The researchers term the process "the missing link in the search for fresh flavor in processed foods." Advantages over present methods of flavor enhancement include cost savings, quality improvement, and fewer problems in meeting government additive regulations. *—FE Staff*



**GRAPEFRUIT PEELER** prepares 32 to 35 fruit per minute for sectionalizing and saves $1 per thousand over hand work. Fruit is positioned in cup, stem up and centered on pencil of light. Then machine drills out stem end. As cup carries fruit through series of stations, these operations are performed: Eight knives on arms come down over fruit to score peel down side. Peel segments are pulled out from top, then are stripped down by gripper fingers. Circular spring lowers over fruit, and plunger pushes fruit up to remove peel segments. Then rotary brush removes fruit from cup. Will peel oranges, too.—Food Machinery & Chemical Corp., Hoopeston, Ill. (300)

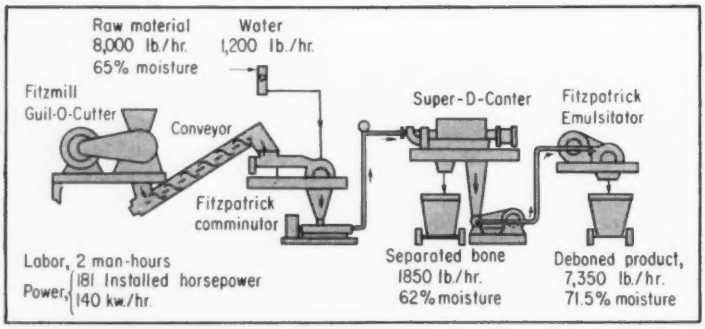


**WIPED-FILM EVAPORATOR** for low-temperature concentration of heat-sensitive products spreads liquid thin on cylinder walls for short exposure. Achieves heat-transfer U-value of 200+ and will evaporate 50 lb. of water/hr./sq. ft. of surface area. Compact 36-in. dia. unit, 10 ft. tall, has 5,000 lb./hr. capacity. Unit has built-in condenser with 2 to 2½ times as much surface as evaporator. Will handle viscous products. Has concentrated tomato juice experimentally from 6% to 50% solids in one pass, and has handled apricot, peach, and prune juices in tests. Juice feeds onto top of 90-rpm. wiper rotor cage, runs onto cylinder walls in front of nylon blades that are slotted to avoid pushing "fillet" of product ahead of them.—Pfaudler Co., Rochester, N.Y. (301)

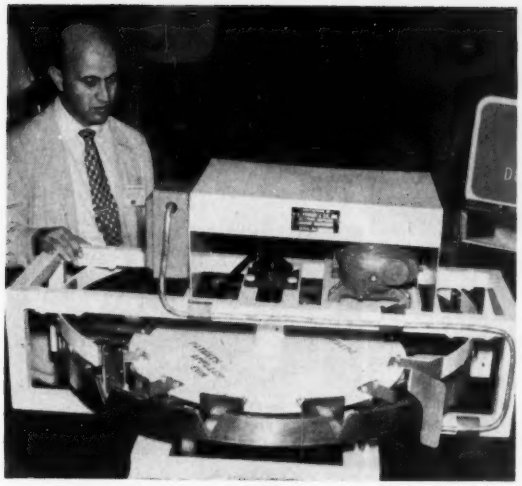
# 4 Major Developments

**. . . in processing, packaging, QC, cleaning, and materials handling seen at annual canning equipment show at Miami Beach**

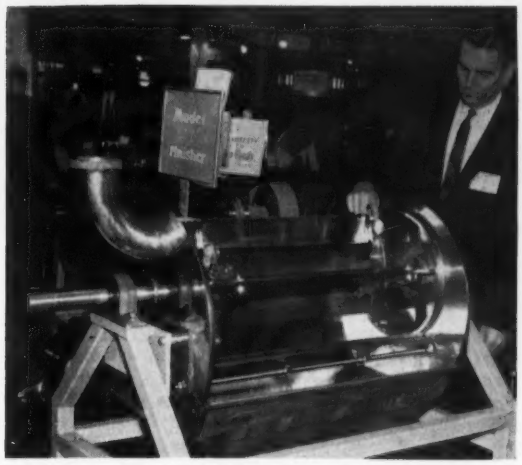
**COST SAVING PLATE EVAPORATOR** just introduced for concentrating orange juice has recently been applied also in dairy field (see p. 60). Is economical in first cost, factory space, and operating costs. Double-effect unit has thermo-compressor to boost efficiency and comes with automatic flow controls. Operates on short-time, high-temperature principle. Easily disassembled for inspection, and plates can be added to up capacity.—A.V.P. Co., Inc., Buffalo, N.Y. (302)




**NEW DEBONING PRINCIPLE** involves continuous comminuting and centrifugal separation of fine meat and bone particles at 8,000 lb./hr. Yield for 100 lb. of chicken necks is 82 lb. meat, 18 lb. bone and gristle, with only 2% loss of meat and no bone in meat. Other meats can be processed raw, cooked, or frozen. Flowsheet depicts operation. Coarse cutter feeds special comminutor with rotating knives and square-hole grid that shreds meat and bone. Addition of small amount of water fluidizes mixture, which is pumped to special classifying centrifuge. Here difference of specific gravity permits separation, the meat discharging "dry," bone wet.—Sharples Corp., Philadelphia. (303)



**FASTER TRIMMER** for removing mushroom root and cutting stem from button can be fed by two operators to double output to 90/min. Mushroom is inserted in V opening in twin-ring rotor. Stem pushes back slide which electronically positions knife for root cut. Spring-loaded knife between rings severs button.—A. K. Robins & Co., Baltimore, Md. (304)



**BETTER FINISHER** (or pulper) for screening products is built of welded stainless steel plate, more rugged paddles, and ball bearings for non-stop operation. Paddles mounted on eccentric bushings for easy clearance adjustment over ½-in. range. There are no exposed threads. Cover (removed in picture) is made vapor proof by neoprene gaskets and has four quick-open clamps.—F. H. Langsenkamp Co., Indianapolis, Ind. (305)

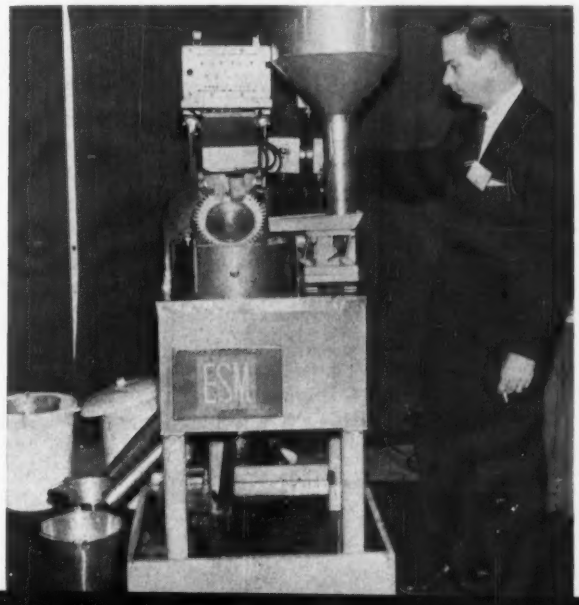
# . . . 17 Important Innovations

**3-WAY JET NOZZLE** gives new versatility to pressure-spray cleaning. Unit rotates in Teflon setting to either of these nozzles: (1) Normal 35-deg. "broom" spray for floors, (2) five-hole for tough cleaning jobs, and (3) single-hole, high-impact for very difficult cleaning.—Sellers Injector Corp., Philadelphia. (306)

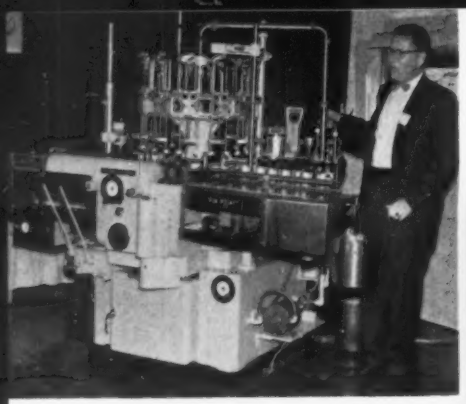
***For more information circle key numbers on Reader Service Card, back of book***

## QC & CLEANING

**ELECTRONICALLY SORTS** wet diced carrots, beans, cherries, and olives at 150 per sec. Unit differs from familiar dry sorter in these respects: Faulty product is rejected from suction fingers on wheel that rotates past photocell by blast of air inside fingers. And electronic circuits are designed to withstand moisture.—Electric Sorting Machine Co., Houston, Tex. (307)



## PACKAGING MACHINES



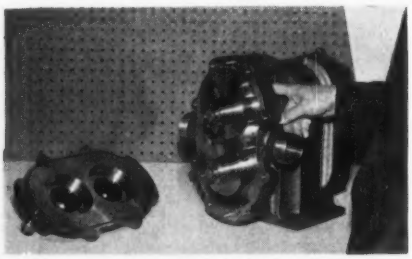
**"PIN POINT" FILLER** with 1/64-oz. accuracy has vacuum pipe inside filling spout. When liquid reaches opening of pipe, vacuum suddenly increases as air is cut off. This collapses bellows to which filling valve rod is attached, quickly closing valve. Container mouth is not pressed against seal, so deformable plastic or paperboard containers can be filled accurately. This pressure-flow unit is recommended for syruping and for fast filling of wide-mouth containers, even No. 10 and gallon cans. Made with 8 to 48 spouts; 24-spout machine fills 12 oz. cans at 325 per min.—Karl Kiefer Machine Co., Cincinnati. (308)

**CASE FEEDER** automates Burt packer. It removes flat case from stack, opens it, and places it over funnel of packer for filling. Feeder is 6 ft. 10 in. long, 3 ft. 9 in. deep.—Burt Machine Co., Baltimore, Md. (309)

**METAL SAVED** by new automatic scroll shear ranges from 3 to 5% in blanking scroll cut strips for die production of can ends and bottle caps from 36-in. square sheets. Magnetic feed bars register sheet against fixed stops for accuracy. Mechanical feed bars eliminate idle stroke between sheets. Speed: 120 strokes/min.—E. W. Bliss Co., Canton, Ohio. (310)

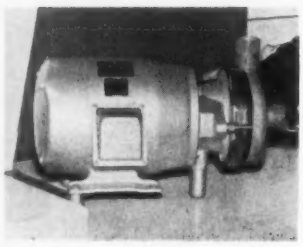
## MATERIALS HANDLING

**PUMP 'N FEEDER** for handling viscous products consists of screw-discharge, taper-wall tank connected by quick-clamp cone to positive-displacement rotary pump—all of sanitary stainless steel construction. Tank screw and pump have variable-speed drives, with 2 hp. for screw and 5 or 7½ hp. for pump. Tank has 6.4-cu.ft. capacity.—Creamery Package Mfg. Co., Chicago. (311)



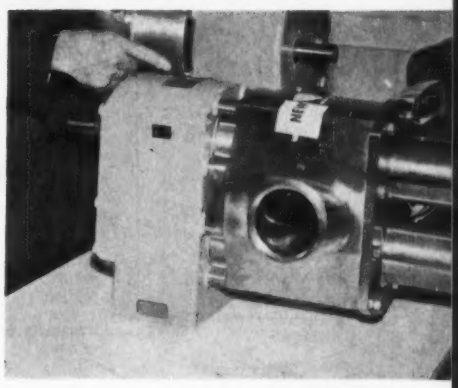
**NEW HEAVY-DUTY,** low-speed, 200-psi. industrial rotary pump is corrosion resistant and easily disassembled for cleaning. Has single or dual seals, is self priming. Twin balanced impellers and helical timing gears give smooth operation.—Waukesha Foundry Co., Waukesha, Wis. (312)

**QUICK-CLEAN** centrifugal industrial pump of lower-cost unpolished stainless steel has hinged release clamp that permits disassembly in 30 sec. Head has involute (expanding spiral) design for full-flow discharge and less friction loss. Sanitary polished stainless model available, too.—Waukesha Foundry Co., Waukesha, Wis. (313)



**TROUGHING CONVEYOR** on pneumatic wheels is of lightweight aluminum construction, including pulleys and rollers, for easy portability. Rubber belt has vulcanized cleats for good sanitation.—A. K. Robins & Co., Inc., Baltimore, Md. (314)

**HIGH-CAPACITY** sanitary rotary pump, up to 200 gpm. at 200 psi., has 4-in. ports. It is equipped with four independent resilient rotors for low-cost individual replacement. These may be single or five-lobe rotors. Another new rotary pump is designed for vertical flow-through.—Creamery Package Mfg. Co., Chicago. (315)

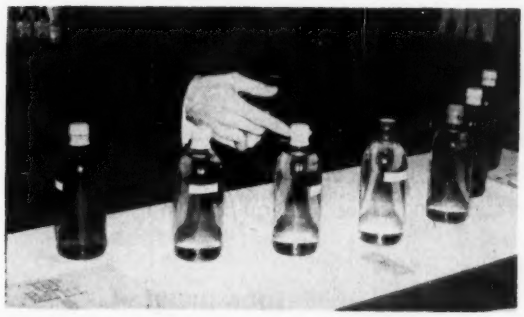


## PACKAGES

**COLORFUL CASES** are economically produced by printing rainbow of colors in one press-run. Ink fountain is split and inks in variety of colors are fed simultaneously. Colors blend together where they join. Effect is striking (see FE cover, March, '59).—Mead Packaging, Inc., Atlanta. (316)

**BEADED 303 CAN,** with 25 small corrugations rolled into its body after manufacture, is 100% stronger to resist hot-pack vacuum and denting in handling and shipping. Can handles easier in conveyors and labeler, costs no more.—Continental Can Co., Inc., New York. (317)

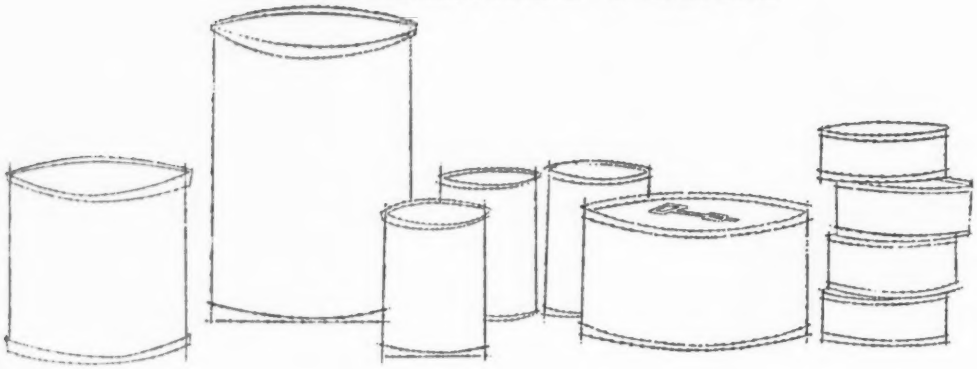
**COST-SAVING CAP** with short flange is up to 12% less expensive than standard cap and 30% lighter in weight (lower shipping costs). Finer threads result in straight-sided, streamlined look.—Aluminum Co. of America, Pittsburgh. (318)



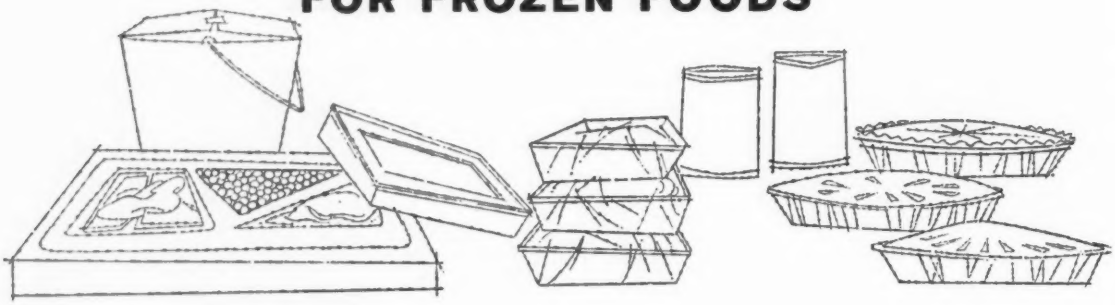
**EASY OPENING** Cel-O-Seal bands are perforated around bottom of cap to break when cap is unscrewed.—E. I. du Pont de Nemours & Co., Wilmington, Del. (319)

**NEW 6-PACK** for Blatz beer in no-return bottles fits over necks, wraps form-fitting tight around bottle unit, and locks securely under each pair of containers. Small openings hold bottoms of bottles in place. Partition is optional. Another innovation is Mead-Johnson 3-variety pack of Metrical products for dietary weight control. This consists of double-tray with connecting ends and open sides.—Continental Can Boxboard & Folding Carton Div., New York. (320)

## FOR CANNED FOODS



## FOR FROZEN FOODS



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# More Additives Get Nod

## Clear Many Packaging Agents . . . Grant Time Extensions

MANY PIECES of the frustrating additive jig-saw puzzle were still scattered as March 5 brought FDA's final deadline pinch.

Even so, several clarifying beams cut through the haze in the last 5 weeks preceding the deadline.

Additions to the White List were announced, a number of chemicals used in packaging materials got official approval, and 12 additives won time extensions.*

### 52 More for White List

Another 52 additives have been proposed by FDA for general recognition as safe for food use.

This list would supplement the Agency's initial White List of 182 that became effective Jan. 20 (FE Jan., p. 81-82). Meantime, numerous seasonings and flavorings also were approved as safe (FE Feb., p. 19-21).

Included in the new 52 are 4 chemical preservatives, 5 buffers and neutralizing agents, 3 nonnutritive sweeteners, 5 nutrients, 8 stabilizers, 2 anticaking agents, and 25 miscellaneous substances.

Recognition of their safety would be for intended use within the meaning of Sec. 409 of the FD&C Act and in accord with good manufacturing practice.

The list follows, with limits and conditions, where applicable, appended in parentheses:

**Chemical Preservatives:**
Calcium sorbate, Methylparaben (methyl-*p*-hydroxybenzoate) (0.1%), Propylparaben (propyl-*p*-hydroxybenzoate) (0.1%), Stannous chloride (0.0015%, calculated as tin).

**Buffers & Neutralizing Agents:**
Adipic acid, Hydrochloric acid, Malic acid, Phosphoric acid, Succinic acid.

**Nonnutritive Sweeteners:**
Ammonium saccharin, Magnesium cyclohexyl sulfamate, Potassium cyclohexyl sulfamate.

**Nutrients:**
Chlorine bitartrate, Glycine (aminoacetic acid) (animal feeds), Inositol, Methionine (0.0125%) (animal feeds), Methionine hydroxy analog and its salts (0.0125%) (animal feeds).

**Stabilizers:**
Acacia (gum Arabic), Ammonium alginate, Calcium alginate, Ghatti gum, Potassium alginate, Sodium alginate, Sterculia gum (karaya gum), Tragacanth (gum tragacanth).

**Anticaking Agents:**
Sodium aluminosilicate (2%), Sodium calcium aluminosilicate, hydrated (2%).

**Miscellaneous:**
Ammonium bicarbonate, Ammonium sulfate, Beeswax (yellow wax), Beeswax, bleached (white wax), Bentonite, Calcium chloride, Dextrans (of average molecular weight below 100,000), Glutamic acid (salt substitute), Glutamic acid hydrochloride (salt substitute), Hydrogen peroxide (bleaching agent), Lecithin.

Mannitol (5%) (in special dietary foods), Methycellulose (U.S.P. methylcellulose, except that the methoxy content shall not be less than 27.5% and not more than 31.5% on a dry-weight basis), Monopotassium glutamate, Nitrous oxide (propellant for certain dairy and vegetable fat toppings in pressurized containers).

Potassium carbonate, Potassium sulfate, Rennet (rennin), Silica acrogel (finely powdered microcellular silica foam having a minimum silica content of 89.5%) (0.00005%) (component of antifoaming agent), Sodium bicarbonate.

Sodium carboxymethylcellulose (the sodium salt of carboxymethylcellulose, not less than 99.5% on a dry-weight

*Turn page*

** At presstime, FDA released a new list of 67 substances generally deemed safe in making paper products for food packaging. The Agency also gave time extensions to a score more additives. Watch for these listings in April FE.*

### A Dozen Get Extensions

Twelve additives now have dispensation from FDA permitting their continued use in foods or food-packaging materials for a period following the recent March 5 deadline, provided manufacturers follow specified limits of amount and restrictions as to their employment.

These substances won their time extension on the basis that no undue risk was seen in their further temporary use pending either determination of official tolerances or denial of petitions.

The extension is either for a period of 1 yr. following March 5 or until the date within the period when a decision is reached on final tolerance or denial.

Here are the products, limits, and specified uses or restrictions as listed by FDA—

| Products | Limits | Specified Uses or Restrictions |
|---|---|---|
| Butylated hydroxyanisole and/or butylated hydroxytoluene | 50 ppm. (combined total) | As an antioxidant in dehydrated potatoes. |
| Coumarone-indene resin | 200 ppm. | In coating on citrus fruits |
| Dibutyl phthalate | 2.17% | In nitrocellulose-coated heat-sealing cellophane for packaging foods. |
| Dicyclohexyl phthalate | 2.17% | In nitrocellulose-coated heat-sealing cellophane for packaging foods. |
| Glycerol monooleate (from chick-tested material or if prepared from ester-exchange process) | 3.5 ppm. | In fluid milk as vitamin oil emulsifier. |
| Inorganic bromides | 50 ppm. | In processed foods from methyl bromide fumigation. |
| Maleic acid | 0.40% | In nitrocellulose-coated heat-sealing cellophane for packaging foods. |
| Oxystearin | 1,250 ppm. | In salad oils as inhibitor. |
| Pentaerythritol testrastearate | 0.09% | In nitrocellulose-coated heat-sealing cellophane for packaging foods. |
| Polymers of pimaric and abietic acids and/or rosin constituents | 0.64% | Nitrocellulose-coated, heat-sealing cellophane for packaging foods. |
| Propylene glycol ether of methylcellulose | ..... | Thickener, stabilizer, protective colloid suspending agent, emulsifier, and film former in foods. |
| Titanium dioxide N.F. | 20% | In adhesives for food packages. |
| Titanium dioxide N.F. | 0.4% | In baked goods and confectionery as pigment. |

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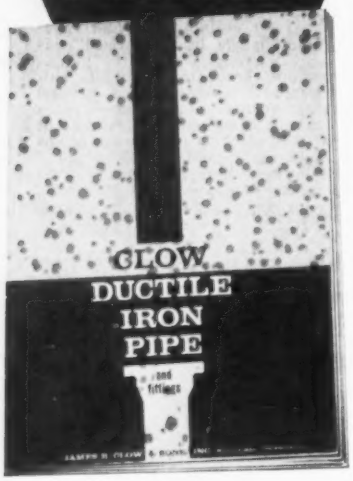
This new book will help solve your CORROSION PROBLEM

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## Additives Approved

*Continued from p. 89*

basis, with maximum substitution of 0.95 carboxymethyl groups per anhydroglucose unit, and with a minimum viscosity of 25 centipoises for 2% by weight aqueous solution at 25 deg. C.), Sodium caseinate, Sodium sesquicarbonate, Sodium pectinate, Torula yeast, dried.

### Packaging Substances Listed as Okay

The following substances have been granted prior sanctions by FDA for use in the manufacture of food-packaging materials.

Thus employed, says FDA, these substances are not considered "food additives" within the meaning of Sec. 201(s) of the FD&C Act, provided that they are of good commercial grade, are suitable for association with food, and are used in accordance with the specified good manufacturing practice.

Here, good practice includes the restriction that the quantity of any of these substances which becomes a component of food as a result of use in food-packaging materials shall not be intended to accomplish any physical or technical effect in the food itself, shall be reduced to the least amount reasonably possible, and shall not exceed any limit specified.

**(a) Antioxidants (limit of addition to food, 0.005%):**
Butylated hydroxyanisole, Butylated hydroxytoluene, Dilauryl thiodipropionate, Distearyl thiodipropionate, Gum guaiac, Nordihydroguairetic acid, Propyl gallate, Thiodipropionic acid, 2,4,5-Trihydroxy butyrophenone.

**(b) Antimycotics:**
Calicum propionate Methylparaben (methyl-*p*-hydroxybenzoate), Propylparaben (propyl-*p*-hydroxybenzoate), Sodium benzoate, Sodium propionate, Sorbic acid.

**(c) Driers:**
Cobalt caprylate, Cobalt linoleate, Cobalt naphthenate, Cobalt tallate, Iron caprylate, Iron linoleate, Iron naphthenate, Iron tallate, Manganese ca-

### "Naringin"—Not "Maringin"

**FDA calls attention to two errors in its recent *Federal Register* listings of safe seasonings and flavorings:**

**Under "(2) Essential Oils, etc.," the word "Maringin" should read "Naringin" (FE Feb., p. 21).**

**Further, the "Botanical name of plant source" for Cusparia bark (included in the original listing) should begin with the word "Galipea," rather than "Calipea."**

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prylate, Managanese linoleate, Manganese naphthenate, Manganese tallate.

**(d) Drying Oils (as components of finished resins):**
Chinawood oil (tung oil), Dehydrated castor oil, Linseed oil, Tall oil.

**(e) Plasticizers:**
Acetyl tributyl citrate, Acetyl triethyl citrate, *p-tert*-Butylphenyl salicylate, Butyl stearate, Butylphtalyl butyl glycolate, Dibutyl sebacate, Diethyl phthalate, Diisobutyl adipate, Diisooctyl phthalate (for foods of high water content only), Diphenyl-2-ethylhexyl phosphate, di-(2-Ethylhexyl) phthalate (for foods of high water content only).

Epoxidized soybean oil (iodine number maximum 6; and oxirane oxygen, minimum, 6.0%), Ethylphthalyl ethyl glycolate, Glycerol monooleate, Monoisopropyl citrate, Mono, di-, and tristearyl citrate, Triacetin (glycerol triacetate), Triethyl citrate, 3-(2-Xenoyl)-1,2-epoxypropane.

**(f) Release Agents:**
Dimethylpolysiloxane (substantially free from hydrolyzable chloride and alkoxy groups, no more than 18% loss in weight after heating 4 hr. at 200 deg. C.; viscosity 300 centistokes, 600 centistokes at 25 deg. C., specific gravity 0.96 to 0.97 at 25 deg. C., refractive index 1.400 to 1.404 at 25 dep. C.).

Linoleamide (linoleic acid amide), Oleamide (oleic acid amide), Palmitamide (palmitic acid amide), Polyethylene glycol 400, Polyethylene glycol 1500, Polyethylene glycol 4000, Stearamide (stearic acid amide).

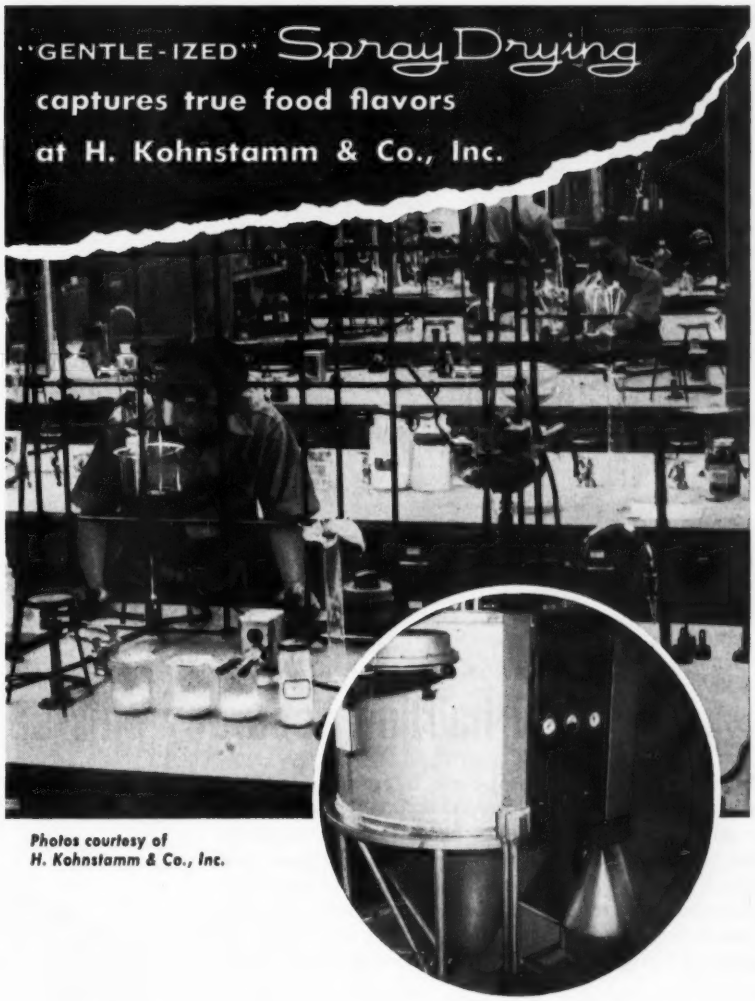
**(g) Stabilizers:**
Aluminum mono-, di-, and tristearate, Ammonium citrate, Ammonium potassium hydrogen phosphate, Calcium acetate, Calcium carbonate, Calcium glycerophosphate, Calcium phosphate, Calcium hydrogen phosphate, Calcium oleate, Calcium ricinoleate, Calcium stearate, Disodium hydrogen phosphate.

Magnesium glycerophosphate, Magnesium stearate, Magnesium phosphate, Magnesium hydrogen phosphate, Mono-, di-, and trisodium citrate, Mono-, di-, and tripotassium citrate, Potassium oleate, Potassium stearate, Sodium pyrophosphate, Sodium stearate, Sodium tetrapyrophosphate.

**Others:**
Tin stearate (not to exceed 50 ppm. tin as a migrant in finished food), Zinc orthophosphate (not to exceed 50 ppm. zinc as a migrant in finished food), Zinc resinate (not to exceed 50 ppm. zinc as a migrant in finished food).

*"What do you mean, you like it? That's what I use for cleaning my equipment."*


"GENTLE-IZED" Spray Drying
captures true food flavors
at H. Kohnstamm & Co., Inc.



*Photos courtesy of H. Kohnstamm & Co., Inc.*

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CIRCLE 91 ON READER SERVICE CARD 

See it in operation at the PMMI Show—Booth 1005

FMC Checkweigher with smooth, positive 3-way segregation.

# NEW fmc high-speed electronic Checkweigher

## ...gives you hairline accuracy plus segregating flexibility

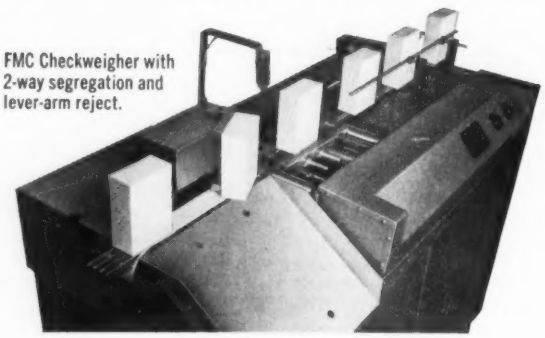
Whatever your requirement there is probably an FMC Checkweigher to provide close and accurate control of your production. Speeds up to 400 containers per minute handle the output of most production lines. And with three basic reject methods to choose from, for both 2-way and 3-way segregation, the ideal system for your problem and package can be engineered. The result is a precision piece of equipment perfectly matched to your production requirements.

Accuracies up to ± ¼% of the total package weight are possible with all three segregation methods:

**3-Way Segregation**—This system is recommended for open packages and tall containers. After the package is weighed and classified, the metal slats of the conveyor move the package straight ahead or ease it to the right or to the left, depending upon whether it is acceptable, underweight or overweight. The action is positive, yet smooth and gentle.

**2-Way Segregation with Air Reject**—With this system a jet of air removes rejected containers from the conveyor. It is most effective with small, closed containers and can be adjusted to reject either underweights, overweights, or both.

**2-Way Segregation with Lever-Arm Reject**—Recommended for heavier, closed containers, this system offers the same three reject choices as the air system.



FMC Checkweigher with 2-way segregation and lever-arm reject.

FMC Checkweighers handle cans, jars, trays or boxes—virtually any semi-rigid container with one flat surface ranging in size from 1½″ x 1½″ to 10″ x 10″. They are splash-proof, easy to clean, and occupy only 48″ x 24″, with the height adjustable to fit production lines. The electronic system is mounted on a single plug-in chassis and housed in a slide-out drawer for easy maintenance.

In addition to the basic equipment, the checkweigher can also be equipped with a feedback control, recording devices to produce a printed record of production, and special-construction models for dusty or explosive conditions.

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***Special 12-Page FE Report***

# Weighing Makes Big Strides

## ★ To new precision ★ To new savings

**Your constant, often frustrating, target as a working processor is more accurate—truly cash-saving—weighing. Here's close focus on the striking precision that the newest systems can give you today, plus a ranging of promising possibilities for tomorrow**

IS YOUR PLANT FREE from the costly tolls of inefficient weighing?

Chances are it isn't. But if not, then your prospects for cutting weighing costs are brighter—brighter, that is, if you take advantage of new methods and equipment available right now.

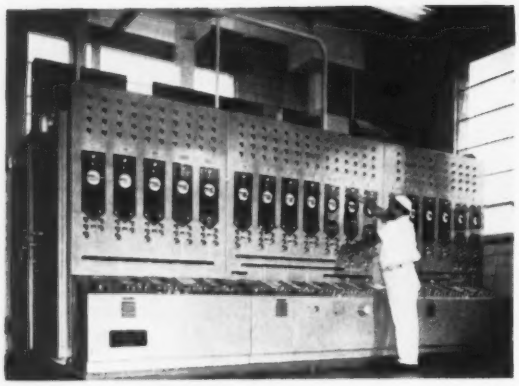
Progress in weighing has been evident on many fronts in the past 5 yr. But both in development of weighing itself and in acceptance of new systems, the progress has been evolutionary rather than revolutionary. Notable in the evolution is the broad base of the progress. Particularly, the mating of automatic controls to scaling systems is opening wide and profitable vistas.

Ingredients, for example, are being sequence-batched from central graphic control panels into mixing, cooking, and other stages. Perhaps more of a surprise are the plug-in units (321),* each a self-contained formula providing pre-set control for the several ingredients required.

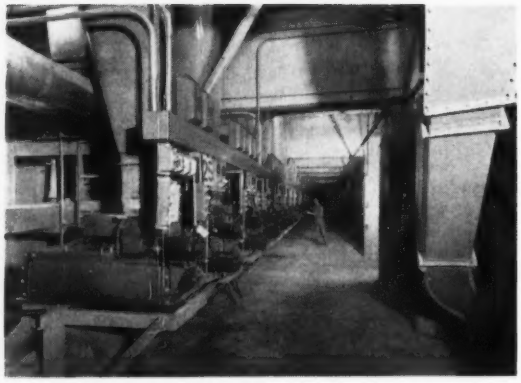
Automated sequence scaling isn't the only avenue of progress, how-


**JOHN V. ZIEMBA**
Associate Editor, "Food Engineering"


* For more information on this equipment, circle this number on Reader Service Card at back of issue. Other pertinent equipment or systems mentioned in this Special Report will be found similarly keyed for your convenience.



THIS CONTROL CONSOLE is nerve center for Nabisco's new cracker bakery. Its electronic brain receives pushbutton instructions for bin-feeding of ingredients to scales, controls delivery to mixers. (323)



BATTERY of gravimetric feeder-meters offers accuracy and versatility for continuous weighing of free-flowing solids. Feeders control flow by weight, and meters tab its rate. Recording and totalizing is pneumatic. (362)

ever. An old-timer dusted off and lifted to new prominence is the strain gage load cell. With its high sensitivity, small size, and essentially stepless resolution, it's proved out as a force-measuring transducer. Reasonable shock loads won't damage electronic weighing and controlling systems containing load cells, since there are no pivots, knife edges, or moving parts.

Multi-function load cells operate on the principle that electrical conducting wire (strain gage), when subjected to mechanical strain (weight), changes resistance proportional to strain. Measurements are made through variations of electrical signal output due to strain-induced resistance changes in a Wheatstone bridge circuit, of which the strain gage is a part.

Fundamentally, your scales are the work horses providing vital information for incoming materials, inventory control, interdepartmental transfers, production scheduling and control, wage payments, packaging, and shipping. And they come in many types, including portable, truck, floor, conveyor, hopper, tank, and industrial track.

To assure product uniformity and to eliminate human errors, controls are applied. For instance, there is linkage through a central control panel to several scales; graphic recorder, totalizer, or printer (for permanent control records); cut-off devices; and constant or varying-feed conveyor, tank, or hopper (with totalizing attachment).

Credited to most of the new developments is the significant benefit of greater efficiency. This is especially won with pushbutton systems that enable greater output (biggest payoff), simplified operations, letter-perfect accuracies, more uniform control of quality, easy adjustment, less maintenance and greater flexibility.

At control boards of new plants, operators punch out batches in seconds. With manual setups, similar batches take minutes to prepare.

Any batch-scaling operation can be profitable, automated. The control system is shaped to mastermind the cycle, with a pressure setup (air or hydraulic) to operate gates. Controls can be spotted anywhere—even far from plant's dust and vibrations. You can even use the same controls when putting up a new plant. Or, if better controls appear, you can easily up-date the equipment.

## What Type Units Are Needed

To even the most casual observer, it's clear that we're in the early stages of a great forward surge in instrumentation and control. Reason is that accurate, efficient proportioning of ingredients is the key for furthering pushbutton operations. We have to take the first steps beyond sequence-batching before we can tentatively jump the divide of digital control techniques.

Manpower and ingredient costs are increasingly expensive. We're more and more aware of areas where human control just can't do the job. Thus, for impelling reasons of economy, control applications must be pushed forward a big notch.

Continuous batching, while elevated to a point of perfection, isn't the answer to efficient weighing. What's required is a continuous weighing system that achieves nonstop metering of ingredients in exact proportions—and with the accuracy of batch weighing setups.

When continuous proportioning relies on volumetric measurements, product density control is required to obtain gravimetric-weighing accuracies. Also, continuous feeding (say in a worm screw) of materials of varying mesh sizes results in particle separation. Constant speed of screw then varies its lb./min. delivery.

Only by industry's specifying raw materials of uniform density and particle size will the use of simple, inexpensive volumetric feed devices achieve accurate weight control on a continuous basis.

Scale belts are used for gravimetric proportioning. But they handle only certain free-flowing materials, and weighing errors can result from overshooting (an error shows up before correction's made).

## Using Pneumatics

Engineers look into the possibility of feeding multiple input signals to multi-function pneumatic relays as a method of measuring and controlling ingredient weights in hoppers or on conveyors.

For example, ingredients could easily be weighed in a square or rectangular hopper with load cells attached to each bottom corner. Distribution in hopper would be no problem, since the four cells would measure total load.

Signals from two cells would be fed to and added by one relay, other two signals by second. Output from both would then be totalized by third relay, whose output would represent weight of hopper load of ingredient.

Weight of belt-conveyed ingredient could be measured by a floating-table mechanism (supporting belt from below) and a pair of transmitters (on each side of table). Setup would measure total load—even though ingredient, coming from pneumatically controlled upstream feeder, isn't evenly distributed on belt.

Pneumatic output signals from transmitters would then feed a multi-function totalizing relay, whose output is the sum of two signals representing ingredient weight. Output is transmitted to upstream feeder to correct deviations in desired weight. What's more, belt's constant speed permits system to control ingredient's flow rate. And belt's output can be rated in lb./min.

This setup could also permit accurate proportioning of several ingredients, while maintaining pre-set flow rate of blend.

## Scaling to Multi-Process

Engineers see no problem in sequence batching ingredients into multiple blending or cooking operation, provided cost of a sophisticated setup is justified. Such a semi-continuous system might involve sequential storage-bin feeding and scaling (in a compartmentized weigh hopper) of different ingredients. A 2-period blending cycle would follow.

During first blending (or cooking) period, another batch of similar ingredients would be scaled. And, during second blending, still other ingredients would be sequentially scaled and discharged into mixer to complete the entire blending cycle.

Controls for this system would be housed in a console consisting of indicating scales with set-points, sequence controller, adjustable timers, fixed timing and other relays. Operations could be automatic, manual, or manual with timers.

The automatic would be carried out by setting required weight for each ingredient, giving sequence instructions to system, and pushing

## Pros & Cons of 3 Systems

**Here is close focusing on distinguishing points of three methods—(1) Available continuous, (2) individual batch scale, and (3) accumulative batch scale.**

**Continuous: Unit is of belt-feeder type, with portion of belt bridging weighing section connected to beam system for indicating and controlling material flow as weight function. Each weigher discharges into common conveyor serving as ingredient collector and blender.**

***Advantages:* Low headroom, and doesn't need mixers (weighers feed directly into mixing conveyor). Weighers run continuously and at high capacity, since all ingredients are simultaneously fed.**

***Shortcomings:* When designed to handle numerous ingredients, initial cost is high. System (accuracy ±1% over a 2-min. period) isn't self-checking, due to calibration difficulties and setting over-under weight control within wide range. Therefore, it doesn't provide good inventory records. Takes long time to pre-set each weigher during formula changes. Tedious to clean because collecting system holds large amount of ingredients. Not flexible, since weight range of each weigher is insufficient to meet formula demands. Requires "spoilage" bin to prevent inaccurately proportioned ingredients from feeding into process during start-ups. Can't remotely control proportioning or delivery rate. Calls for special feeders and controls for difficult-to-handle materials.**

**Individual Batch Scale: Each ingredient is discharged from a separate scale onto a collecting-mixing conveyor.**

***Advantages:* It's accurate (¼% for each scale) and generally doesn't require mixer. When additional mixing is required, it serves as pre-mixer that shortens blending time. Capacity is high, each ingredient being simultaneously weighed and discharged with little idle time. It's self-checking. On demand, each scale will readily provide accurate inventory records. Doesn't call for spoilage bin or additional controls for special feeders.**

***Shortcomings:* If numerous ingredients are handled, initial cost is high. Each system must be individually set. Clean-outs are tedious because collecting system holds much material. System isn't flexible, since weighing range for each scale isn't wide (however, frequency of discharges can be varied to extend range). Lacks remote control over proportioning or delivery rates. Requires special feeders for difficult materials, and needs more headspace than continuous system.**

**Accumulative Batch Scale: Ingredients are fed to weigh hopper, which must be large enough (125-300 cu. ft.) to hold entire batch. Hopper discharges stratified ingredients into mixer below. According to mixing requirements, diverting spout below scale alternately discharges into two mixers.**

***Advantages:* Accuracy is ± one dial division (1/10% on total batch). It's self-testing, since scales check empty balance following discharge. Provides accurate inventory through batch counter (self-checked batch weight forms record). Keeps permanent record, with ingredient weights and tare checks (following each discharge) printed or charted. Also visually indicates ingredient weights. System is more interlocked than others, and doesn't require spoilage bin or additional controls for special feeders. Cleaning is easy, since only small amount of material remains in collecting system. It's most flexible system as to weight range and settings. And it can be equipped with centralized controls and process indicators.**

***Shortcomings:* One or more mixers (depending upon volume requirements) are necessary. Requires more headroom than individual batch method. Capacity is slightly reduced, since each ingredient is intermittently scaled. And initial costs are higher when handling small number of ingredients.—*John K. Rudd, Chief Applications Engineer, Richardson Scale Co.***

start button. Control unit would then weigh out correct proportions of ingredients, deliver them to blender, and time mixing operations. This cycle would be repeated for required number of batches.

As a safety feature, interlocks would stop operations if any storage bins were empty or if electronic equipment failed. System would not start operating until discharge door is closed. So it would be impossible to charge two batches into a blender.

Basic weighing system could comprise load cell and self-balancing bridge indicator. Load cell would consist of several strain gages bonded to a steel billet and connected as a bridge network. When billet is deformed by a load, gage's resistance changes and unbalances bridge network. Voltage applied to two terminals of bridge produces an unbalance voltage (proportional to load) across other two terminals.

Self-balancing bridge indicator then amplifies unbalanced voltage, driving servomotor coupled to dial pointer. Pointer's shaft is geared to potentiometer in measuring bridge circuit. Servo drives until unbalanced voltage across measuring and load-cell bridges are oppositely equal. Pointer's static position is then proportional to weight load.

## Punch Cards and Pushbuttons

The food industry can pirate a treasured idea from a feed mill now automatically blending various formulas of animal foods under punch-card control. Cards program the weight of batch and proportions of its ingredients. Control system principally consists of telephone-type relay and stepping-switch circuits.

Milling operations are controlled from main console, comprising two systems. One routes incoming grain from barge or truck unloaders, other controls plant's conveyor system drawing ingredients from 20 storage bins and delivering them to any of 24 blending bins. Blenders are split into six groups of four, with each group feeding an automatic scale.

Punch cards are prepared for each mix, with punchers containing data for bins and weight of required ingredients. When start button is punched, electromagnetic clamps hold card until sequence is completed. Then multi-position stepping switches scan card's six groups of four lines (four bins hooked up to each scale), one line at a time. As punched hole in weight range is encountered, stepping relays determine number of discharges scale is to make before scanning continues.

Bin's feed gate opens to charge ingredient into scale hopper. As scale approaches balance, beam trips a limit switch that trickles feed. A second limit switch then cuts off feed when balance is reached, and discharges batch onto conveyor. Each weighing counts down the stepping relay in discharge counter by one position, until home position is reached. Sequencing is then completed.

Remaining punch holes (corresponding to fractions of a 200-lb. load) are now scanned by main stepping relays. Data from these holes (stored on relays) then operate an electro-mechanical weight-selection system. Weight platform contains a number of balance weights (totally 224 lb.) that are removed by a selector platform containing electromagnetically-operated hooks engaging loops on individual weights.

Selector platform lowers when information in last holes in a particular card line is read. Relays (corresponding to weights to be removed) are energized. And when platform raises, unwanted weights are lifted clear.

## Pushbutton Brewery

One large brewery has even integrated batch-sequencing of ingredients (322) into its mash cookers with automatic handling of grains. Operator at central panel automatically unloads rice and malt from truck or RR cars. Grains are pneumatically conveyed for distribution, through multi-channel selector, to storage bins. Even dust collectors over bins are panel-controlled. Panel lights indicate when bins are filled and ingredients are ready for batching.

Operator then uses special brew formulas to select predetermined amounts of ingredients. Batching cycle is pushbuttoned to gravity feed the ingredients in sequence from bins to scale hopper. Total batch weight is indicated on dial scale adjacent to control panel, and also printed on a ticket.

At end of cycle, pneumatic gate opens to discharge ingredients from hopper to mash cookers. After steam and hops are introduced according to schedules, mash is cooked before it's transferred to cooker and fermenters.

## Automated Bakery

Case where automatic proportioning (323) is cutting ingredient costs is a pushbutton bakery, where batches are console-controlled, with read-outs from 18 remotely located scales indicated on central panel. Operator at panel follows flow of each ingredient terminating in any of 16 dough mixers.

### What to Look For

**Here are prime points to check when you compare automatic weight proportioners. The ideal system should—**

- **Be flexible—permit operator to select "in" or "out" individual ingredients, since not all materials go into most formulas.**
- **Operate accurately by holding ingredients to closest weights.**
- **Select ingredient weights over a variable range, according to all formulas to be processed.**
- **Permit easy pre-set of desired weight of each material.**
- **Repeat accurate weighings as long as necessary.**
- **Indicate to operator, through alarms, any major departure from scheduled performance.**
- **Be self-monitoring by using automatic interlocks to maintain correct weights, prevent feeding weighed materials until mixer and its conveying system are ready, protect system against material shortage, safeguard against overload, and permit manual addition of trace materials before scale discharges.**
- **Maintain reliable inventory of ingredient usage by tally on scale record or via permanent tab of recording chart or weight printer.**

## Weight Selecting—Foolproofed

**Remote weight selecting and formula changing now provide greater speed, flexibility, accuracy, and economy. These central panel-operated systems coordinate storage, proportioning, and processing of solids, liquids, or both.**

**Panels are front-access (floor or wall-mounted) and walk-in (console or graphic) types. Electrical controls directly operate, in sequence, feeder, gates, scales, mixers, and conveyors used in proportioning and blending materials in batch or continuous processing.**

**Simplest is the weighing of a few ingredients from a wall-type *dial-selecting (vernier or digital) and re-setting panelboard*, through which feeding, weighing, and discharging are manually or automatically controlled. Any number of ingredients can also be delivered to a single scale, with amounts remotely set or varied as formulas demand.**

**Industry, however, saw shortcomings in the dial-setting method. It's simple—but not simple enough. And it isn't foolproof. Setting and reading of dials is left to the panel operator who may, in some cases, make errors in selecting weights.**

**Next move was to switch formulating to the punched card-reader technique. By placing a punched card (on which formula is stored) in a reader, pulling a locking device, and pressing "start" button, operator initiates weighing, proportioning, blending, batching, and sequencing. Through indicating lights, reader registers weights called for by card in the order each ingredient is sequenced into batch.**

**When some operators found these cards too fragile, manufacturers came up with something still better—the *formula board*. This cribbage-like board has horizontally and vertically spaced holes into which contact cords (presenting desired weight-selection combinations) are inserted. Board, which controls over 20 ingredients, is inserted in a receptacle, engaged, and thus governs complete operation.**

**Question still remains as to who's best qualified to insert cords. Formula-board verifiers are now being employed to check out boards before they're passed to panelboard operator. Verifiers are of console type, with a series of lights indicating materials, weights, timing procedures (sequencing materials in and out of scales and into mixers), pacing of mixing operations, etc.**

**Next step in foolproofing remote formulating was adoption of the formula capsule with electronic components capable of controlling up to 24 ingredients in a formula. Where more ingredients must be handled, capsules can be grouped. Though economic, the capsule isn't as flexible as the punch card or formula board, since it doesn't time the various functions.**

**To pre-set, capsule is inserted in formulator. Indicator switch is then positioned, dial is adjusted to desired weight, and indicator meter is balanced. Indicator switch is then flicked to next position, and same procedure is repeated for remaining ingredients.**

**Formula identification employs a removable card that slips into place on top edge of capsule. Transparent cover locks card that's inserted in panelboard slot. Operator presses button to start operations.**

**To verify, capsule is inserted in formulator. However, capsule can also be set up without formulator by inserting it in main control panel and using scale dial. Scale dial is blocked in desired weight position, and each setting is adjusted until panel light indicates correct weight. Or, material is fed into scale until weight reaches setting, with weight adjusted by signal light.**

**Typewriter readouts are being used with remote weight-selecting systems equipped with dial scales in order to simplify billing and accounting. Solenoid-operated typewriter maintains printed records of batch number, weight of each ingredient, and total batch amount. Special feature is a column verifier comprising a printed circuit attached to machine's carriage. It operates through checking or indexing circuit to assure typing of records in proper columns on forms.**

**Industry is now working out a sophisticated system involving insertion of a group of cards, boards, or capsules in a panel to set up a complete day's production run. Thinking is in direction of using any number of capsules together with means for running out varying size batches. Example is batching out any number of dough formulas in preparation of variety breads, with formulation of any percentage amount of batch from called-for formula.**

**Some in the industry even look ahead to the day when they'll schedule their day's—even week's—production on punch tape. Tape will be fed to a control panel for automatic formulation of any number of batches in any batch-percentage amount.**

**Now on drawing boards is a scanning system for checking, in sequence, a number of bins to trigger replenishment of supply whenever one is low. Relay stepper-type unit will be hooked to eight bins (each with several level controls) feeding 36 scale hoppers above 6 mixers.**

Batches are formulated by selecting mixer, then punching "start" button for each ingredient (per formula card). Coupled with conveyor system, panel controls automatic feeding of material from 14 flour bins, 2 sugar bins, and storage tanks for shortening, invert, molasses, and water. With this system, bakery can proportion three different formulas simultaneously.

Ingredients are sequence-delivered, and proportions are called for by specific formulas. As each phase of an operation is completed, panel-signal light notifies operator. When ingredient is delivered to mixer, light beside panel card on board flashes.

System is interlocked with all elements it controls so that any operation can, if necessary, be stopped. At start of each weighing cycle, a "ready-start" light blinks, indicating scale is at tare. At end of each weighing, an automatic check-out weight is made. Under- and over-weights are panel-indicated, and scale is automatically held up for correction.

System can be set up by punch cards that establish inventory control, with recording, accounting, and billing through business machines.

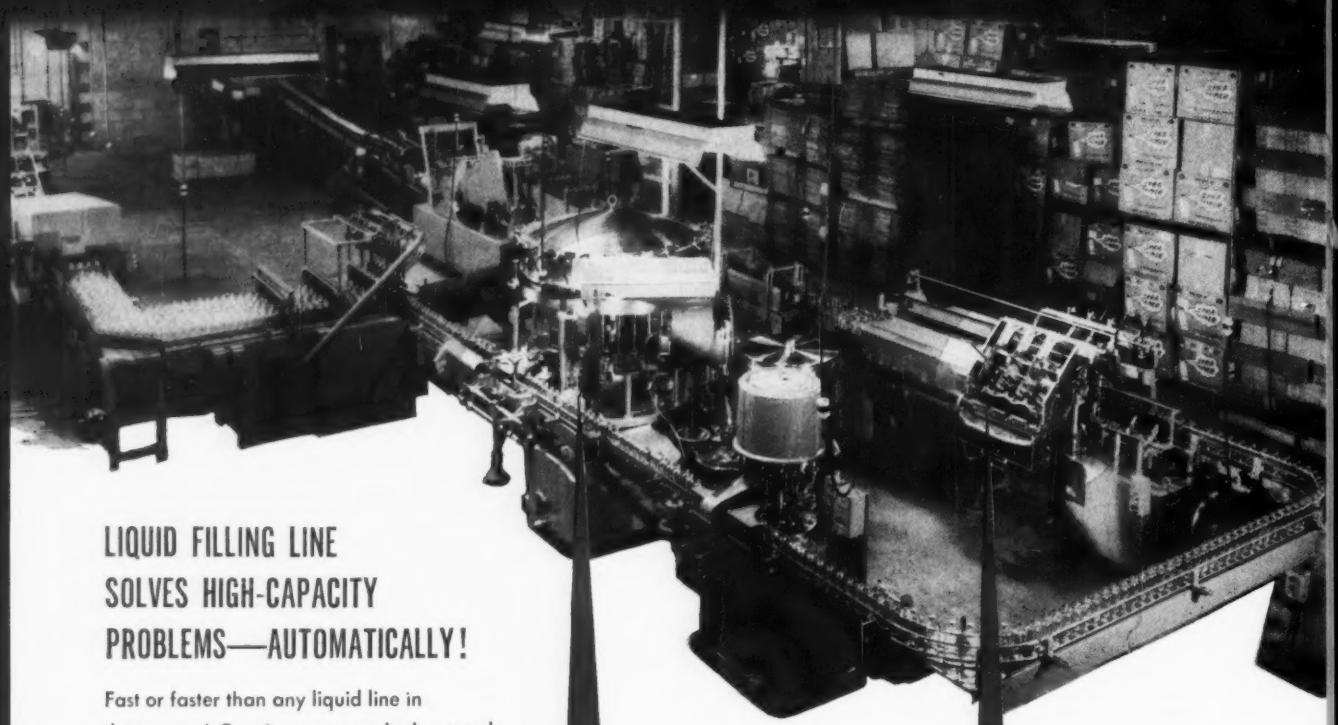
## 23 Advanced Systems

Particularly worth your check are more than a score of advanced devices and set ups. Let's focus in on them—

Speedy, simplified batching of free-flowing material is the job of a 40,000-lb./hr. automatic weigher (324) offering: (1) Accurate repeat weighing (compensates for product adhering to hopper), (2) listing and totalizing of weights, and (3) remote locating of operating controls and adding machines.

Console houses controls for weigh-

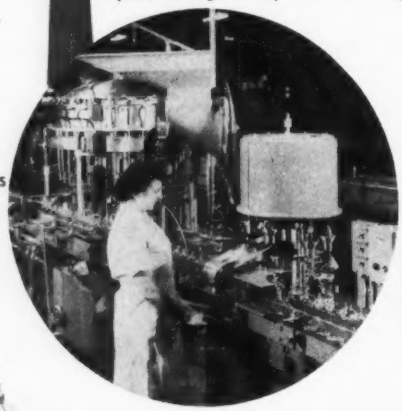
# now we can fill 15,000 BOTTLES of YOUR PRODUCT every hour...



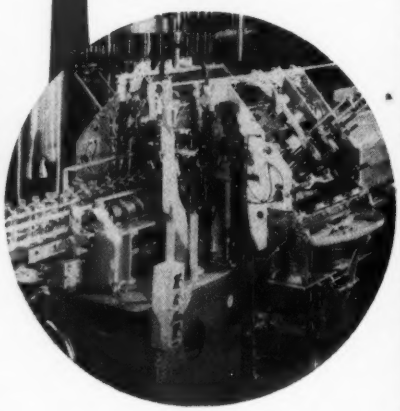
## LIQUID FILLING LINE SOLVES HIGH-CAPACITY PROBLEMS—AUTOMATICALLY!

Fast or faster than any liquid line in the country! Empties are unpacked, purged, filled, capped, labeled, and delivered to trailers in sealed cartons—in one *continuous operation*. Handles any bottle up to 1 gallon, including high-density polyethylene. Call or write today for details about Stalfort, the nation's largest aerosol loader and custom filler of conventional packages. Also, a high speed sanitary line for food or pharmaceuticals —even powder.

**NO IMPURITIES!** *Vacuum-cleaned bottles speed through rotary filler and capper.*



**NO OFF-CENTER LABELS!** *Any size or shape labels placed front and back by electronic timer.*



**NO "DOWN" TIME!** *Sanitary storage tanks hold up to 15,000 gallons for continuing operation.*

JOHN C. **STALFORT** AND SONS, INC.

321 WEST PRATT STREET, BALTIMORE 1, MARYLAND

ing, plus a listing-and-adding unit that records weight data from remote scale. Number of batching cycles are pre-set and, as each cycle's completed, figure's recorded on digital indicator. Used with weighing system, it can be spotted up to 1,000 ft. from scale.

In one plant, syrups are even automatically batched (325) in a blending tank mounted on a 30-ton scale. Operator simply sets two hands on scale's dial, one for first ingredient weight, other for total batch weight. Flow of syrup (1st ingredient) shuts off when indicator reaches first pointer. Tank's agitator then starts as second ingredient is pumped until reaching final batch weight. Agitator continues running until batch is thoroughly blended.

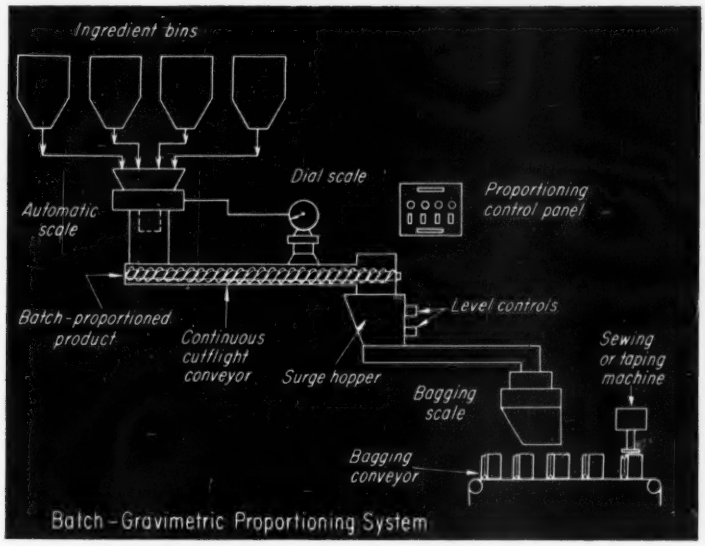
**An easily installed system (FE Apr. '56, p. 70)** for robot-blending bake mixes requires only timers and scales. Employed is a dual system of weighing shortening and drys into ribbon-mixer with screw-conveyor discharge to bagging machines. Shortening is automatically made up with assist of timers that feed fat and steam to jacketed kettles, discharge melted shortening to scaling tank and into mixers, and supply current to thermal wires that heat pipelines. Drys are sequence-timed for conveyor-feed into another scale hopper and discharged into dump hoppers, sifters, and mixers.

A continuous weigher (326) controls flow of drys in accordance with manually set pneumatic signal or in proportion to automatic signal form external source. Feed is maintained within 1% over any 1-min. period.

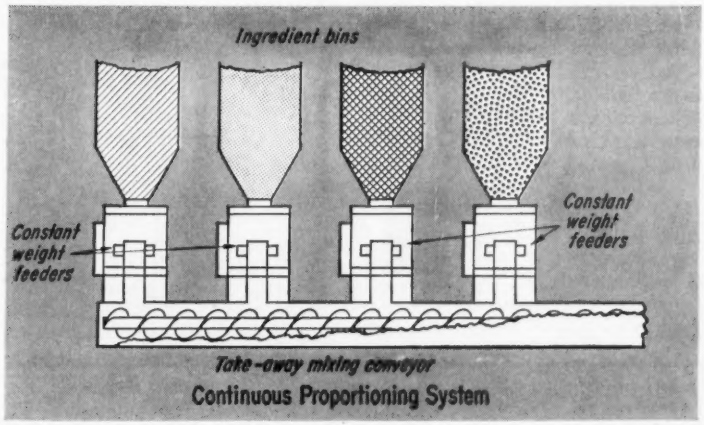
One bakery has substituted a permanently fixed scale hopper (327) for its former five rail-traveling units. Closed scaling system (employing Fluidizer conveyor) is more accurate and sanitary. It also abolishes overhead rails, beams, scale mechanisms, electrical controls, power for moving scale hoppers, and need for headspace over mixers.

Instrumentation is simplifying making of liquid sugar. One new facility (328) employs 2,500-gal. mixing and 10,000-gal. storage tanks that are gaged by weighing system using load cells and indicator controls. Proportioned are sugar and water, whose flows to mixing tank are automatically cut off. An instrument for both tanks totalizes load, gives direct reading up to 30,000 lb. with 0.1% accuracy.

## Major Systems for Weight Proportioning Ingredients




**SINGLE SCALE automatically proportions product by cumulative weighing. Modification is individual scale method employing multiple discharges from separate scales for each ingredient that's discharged onto common conveyor. (363)**

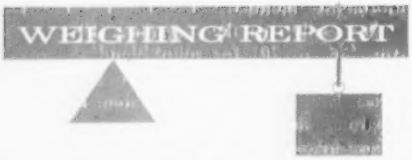



**EMPLOYED HERE are weighers for each ingredient delivered onto collecting-mixing conveyor. (364)**

## Belt-Weighers

Straight-through weigher (U. S. Patent 2,746,739) indicates total weight of belt-conveyed material regardless of running speed of belt. Part of belt passes over a weigh bridge resting on a magnetostriction cell. Pressure changes cell, whose signal variations are transmitted to a magnetic amplifier.

Belt's motor also drives a tachometer generator, whose output is applied to a motor that is actuated by the difference between generator and line-circuit voltages, in proportion to the belt's speed. Motor moves index of potentiometer, from taps of which come a voltage that amplifies that of weighing cell. The




combined voltage drives motor of a calibrated weight totalizer.

Weigh-in and weigh-out scale (329) handles sticky and non-free-flowing materials. It consists of weigher, scale dial, and totalizer. Weigher, comprising weigh hopper mounted on short belt conveyor, is suspended from levers terminating in dial scale. Belt provides live bottom for weigh hopper and facilities produce discharge.

Unit is a differential scale that delivers selected amount of material, weight of which is difference between fully and partially loaded scale. Electronic controls govern different weighings and convert weight from analog to digital indication.

In operation, operator starts material feed into hopper from remote panel board. Feeding stops when hopper is loaded (dial pointer indicates weight and tare weight of hopper). Belt then discharges. As material drops from weigher, scale pointer returns to tare weight and belt stops.

An accurate system for weighing in-transit material on a belt conveyor (330) combines dial indication, chart record of instantaneous flow rate, and totalized counter reading of accumulated weight. It can be arranged for proportioning flow of other solids and liquids to material on belt.

## 5 Ways to Inventory

**Simplest inventory control in accumulative proportioning is achieved with a counter that indicates number of batches weighed out by scale since resetting. Total production is product of counter reading at specific time and batch weight.**

**If batch counts are insufficient, dial head may be equipped with printer utilizing paper tape onto which accumulative totals for each batch are recorded as ingredients are successively scaled. Method provides permanent record of each weighing. Separate ingredient weights are figured by subtracting, and total usage of each ingredient is tabbed by adding appropriate individual weights.**

**Charts are also used with remote dial repeaters for recording each weighing. From chart, entire batch runs are compared, with weights of individual ingredients found by subtraction.**

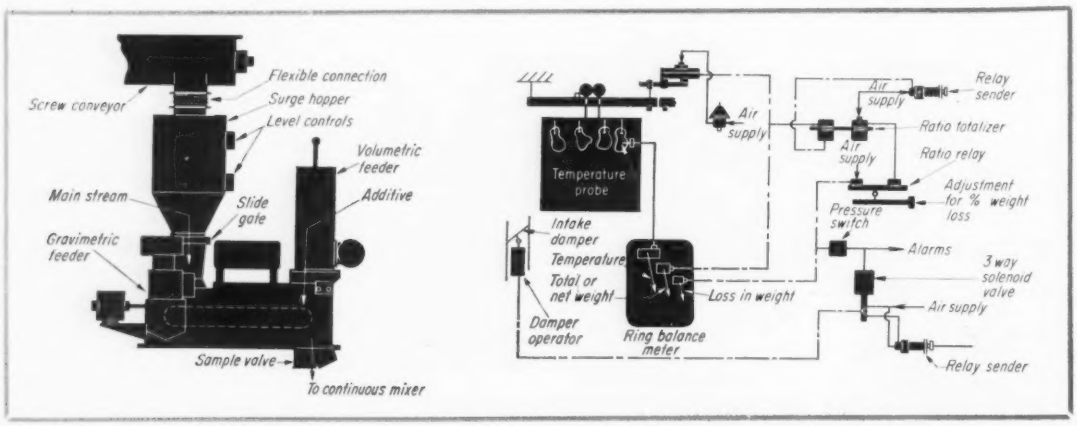
**A recent system uses totalizing counters for each ingredient. During weighing cycle, rotation of scale's dial pointer drives servo, which in turn rotates shaft linked by clutches to revolution-type counters (provided for each ingredient). Normally disengaged, the clutches engage when ingredient feeders operate, then corresponding counters record pounds of ingredients scaled.**

**Each counter maintains cumulative record of ingredient usage, eliminates need to figure out usage (as with above-mentioned systems). Like batch counter, system doesn't maintain permanent records. Nor is it possible to determine amount of each ingredient introduced into a batch. But an auxiliary counter for each ingredient would indicate number of batches into which that specific ingredient was charged.**

**Most complete inventory system would involve printing "net" of each ingredient scaled in each batch and, at the same time, accumulative total usage of each ingredient for cost-accounting department. System requires analog-to-digital converter to reduce scale dial pointer's angular position at any instant to correct poundage. Digital signals are fed to electronic adding machines that print individual weights and maintain accumulative total. Latter's printed out by pressing totalizing button.**

System operates by measuring belt's speed and weight of material on it. Belt-driven tachometer generator produces voltage proportional to belt speed. Voltage is applied to a strain gage–force-sensitive load cell that electrically measures weight of material on belt. Cell's output voltage (proportional to weight times belt speed) is measured by modified poteniometer (with calibrated adjustments) that displays instantaneous rate on dial. Integrator indicates accumulated weight on counter.

A "radioactive" scale (Hawaiian Sugar Co.) is accurately weighing bagasse flowing from crusher. Rays from cobalt source pass through material to Geiger counter that measures intensity. Amount of ab-




**SCALE-VOLUMETRIC FEEDERS continuously produce bakery-type icings. Sugar is conveyed to surge hopper, then gravimetrically fed by scale feeder. Next, powdered milk is volumetrically and continuously fed onto weighed, belt-conveyed sugar going to mixer. (365)**

**CONTINUOUS IN-SMOKE WEIGHER measures and controls weight losses and internal temperature of meats during smoking operations. (337)**

sorption is proportional to weight of material.

A panel-controlled sugar weighing-conveying system (331) features a single 600-lb. scale for bulk-handling 500,000 lb. of refined sugar per shift to outbound trucks and RR cars. Refinery's entire screw-belt conveyor network is laid out so all lines lead to single-scale center. System is interlocked so different grades of sugar can't be mixed.

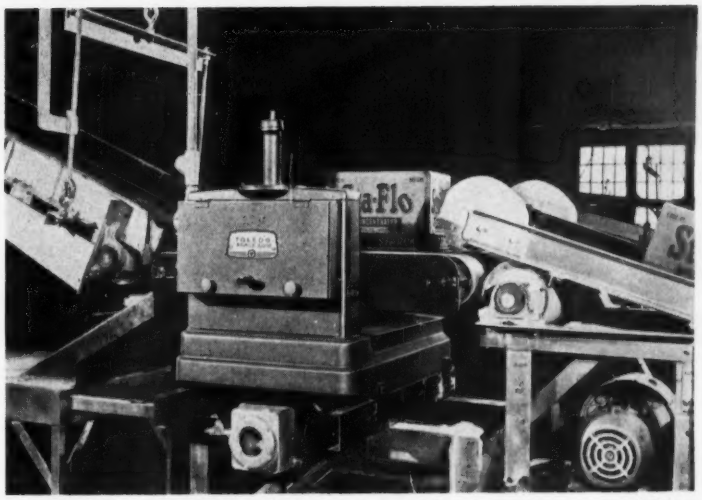
Conveyor and scale turn on after pre-determined number of scalings. At panel, selector switch is set to draw sugars from refinery or storage bins. Dial regulates number of 600-lb. weighings desired per run, and indicator flashes when there's enough in scale hopper to start weighing.

Up to 15 milk cans per min. are automatically dumped and weighed by a new system (332). Conveyed cans hit stopper that holds them in line until lift mechanism is in loading position. A feeler control then lets a can slide into place and actuates a lift-dump mechanism.

When emptied, a pushbutton starts: (1) Unit that prints receiving data on two tapes, (2) scale that records total weight of dumped milk, and (3) motor-controlled discharge valve that opens to drain weigh tank.

An automatic weighing system (333), designing for any number of tanks, comprises electronically operated load cells and indicating panel. It affords dial-controlled fill, empty, or total positions.

**PRINTWEIGHER offers full identification of printed weights, provides cost-control data. Also, printers are available for transmitting digital weight data to remotely located adding machines, or other office units. (366)**



**AUTOMATIC CHECKWEIGHER employs belt-type conveyor on weighing section. Checks packages 40/min., rejects under- and over-weights. (367)**

A baker is using a self-installed "phone-type" dialing system (FE Feb. '59, p. 88) to pneumatically convey flours into central scale hopper. Thus, flour is dialed out of hopper and into battery of dough mixers.

A scale-mounted sugar bin (100,000-lb.) and conveyor system (FE Mar. '58, p. 94) abolishes manual handling of sweetener at a strawberry-sugar blending station. System also eliminates mechanical handling problems. Here, demand for sugar to be added at fixed blending ratio by weight and packout is determined not by weighing berries but sugar.

System has twin-screw circulating conveyor operating in parallel troughs, with sugar moving in opposite directions. Circulating conveyor automatically accepts sugar from bin as required by packing process. Net weight of berries fed to process is determined by weighing each pallet load (deducting tare) before they're dumped. Vibrating feeders receive sugar from conveyors and proportion it (on weight basis) to dumped berries. Weight of added sugar is read on scale.

Automatic sizing system (334) handles 5,000 chicken parts hourly. Unit is equipped with four scales set to ½-oz. weight variations and ¼-oz. accuracy. It's an adaptation of whole-bird sizer that employs mercury switches.

A new dough-weight control system (335) curbs give-aways in bakeries by checkweighing 160 pieces of bread dough per minute and rejecting underweights. Unit also comprises lightweight corrector with dough make-up adder.

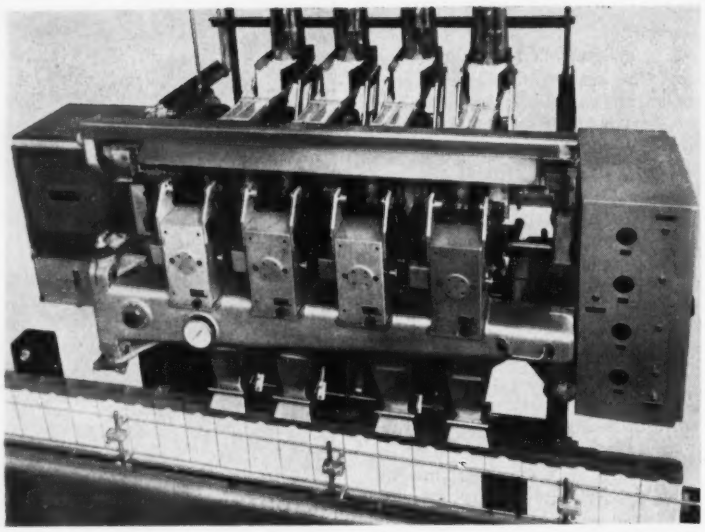
## Measures Liquid Flow

Long search for a practical instrument to directly measure liquid flow in pounds has resulted in a "true mass" flowmeter (336). Simple, low-maintenance device measures weight of flowing liquids with high accuracy over wide ranges of flow rate, pressure, temperature, and density. And it does it without additional measurement and correction for these variables.

Flowmeter emits a series of electrical impulses, each representing given weight of fluid. Signal can also be employed to operate auxiliary equipment.

Unit has a flow-rate sensor combining constant-speed impeller and stationary turbine arranged for axial flow. Further component is a small gyroscope that directly and automatically totalizes flow. Impeller "twists" fluid stream, while fixed turbine "straightens" it. Amount of torque on turbine is proportional to mass rate of flow. Gyro integrates this torque with respect to time, with output continuously summed up in pounds on a cyclometer dial.

An "in-smoke" weighing system (337) continuously scales a "tree" of sausage, hams, or bacon. It overcomes difficulties arising from large tare weight of empty trees (in comparison to loads of product), large variation in weight between trees of different meats, and relatively small



THIS 4-HEAD WEIGHER—the Pneumatron—requires no adjustments for changes in product density. Weighs to accuracy that precludes need for checkweighing. (347)

weight loss that must be measured and controlled.

System employs pneumatic balance with pressure recorder. Ratio relay is adjusted to desired percentage weight loss for a particular product. Instrument records internal smoking temperature, weight, and loss of weight.

A new gravimetric feeder (338) now assures reliable coal feeding to pulverizers or cyclone burners to assure: (1) Closer control of air-fuel ratio, (2) equal division of fuel flow among the several firing units of single boiler, and (3) direct regulation of rate of coal feed by combustion-control-system impulses. Rate of coal feed in lb./hr. is indicated on boiler panel.

Continuous scale feeder delivers whole green cocoa beans into continuous roaster. It compensates for product-density changes to permit roaster to operate at maximum efficiency. Uniform flow prevents under- or over-roasting. Accuracy permits starting oven immediately upon reaching required heat. Feeder-totalizer provides inventory check against bag or bulk shipments (339).

Scale meter totalizes, indicates, and records output of milk, coffee, and egg dryers. Air signal controls addition of other ingredients to dried product (340).

Pneumatic scale feeder, equipped with air-operated vari-speed drive, controls feed rate. Feed rate proportional to flow is obtained through flowmeter that develops "set" pressure linear to primary flow. Dosage or ratio adjustment is set on pressure regulator and gage that controls speed of feeder-weigh belt. Both air signals are recorded by dual-pen pneumatic unit to provide record of flow rate through feeder and ratio of feeder-to-primary flows (341).

## What Auxiliary Units Do

Another pneumatic scale—complete with controller—regulates speed of screw conveyor. System is utilized for feeding material that tends to flood or is difficult to remove from hoppers. Screw conveyor is employed as volumetric feeder. Large opening in bottom of hopper minimizes arching (342).

Mated to scaling systems are such time-saving and cost-cutting supplementary units as:

**Sequence controller** (343), have ing no moving parts or contacts, that electronically actuates multiple weighing operations. Its "memory" units and magnetic amplifiers are designed for split-second functioning and trouble-free maintenance. Components are readily plugged in for various flexible arrangements.

**Remote counter** (344)—an electrical unit with special clutch drive—records up to 200 weighings per minute. It tabulates and records weighing operations from any point in plant, keeps production records, and tabulates customer's order. Unit has two rows of digits, one for cumulative total, other for individual weighings.

System works electro-mechanically. Signal is sent from single-pole, double-throw counter-impulse switch located at scale. Signal is transformed into mechanical power by counter's solenoid relay. Actuated relay releases and engages clutch that rotates main shaft (mounted to counter cam) a half-revolution to move dial number. Second impulse rotates shaft the remaining half-revolution to register full count.

**Digital totalizer** (345), driven by servo unit, converts analog scale readings (weight) to digital equivalents. Unit acts as weight totalizer, with dial-hopper scale giving running total weight of batches discharged. Unit operates only when dial pointer returns to zero. As hopper scale fills and pointer moves from zero to full-load reading, totalizer disengages.

## Filling-Weighing Units

Under-weight packages lose you customers, can bring government action. Overweights are certain to eat profits. You can't eliminate these differences—but you can limit them.

Of two basic weighing-fillers (net and gross), net unit scales product, then fills it into package, while gross weighs product and package. Both commonly use a balance beam (though some newer versions don't).

Most weighers employ balances, spring scales, or liquid-displacement scales. A balance is weighted to counter weight of product and tare of carrying bucket. Deflection of a scale's spring supports product and bucket. Buoyant force of displaced liquid also supports product's and bucket's weights.

In all three cases, scale signals when pre-set weight is reached. Signal is then detected by electrical contact, pneumatic relay, or electronic system.

To speed weighing without sacri-

# *Make sure of the service... before you buy!*

Costs start climbing the minute a fork truck goes out of service. The national average for truck downtime is conservatively estimated to be $16.48 per hour. An important reason why fast, qualified parts service is essential.

It's why Clark dealers offer you the largest inventory of parts in the industry. It's why Clark maintains a 16,000 mile private wire communication system. It's why Clark has built a multi-million dollar parts warehouse near Chicago's Midway Airport.

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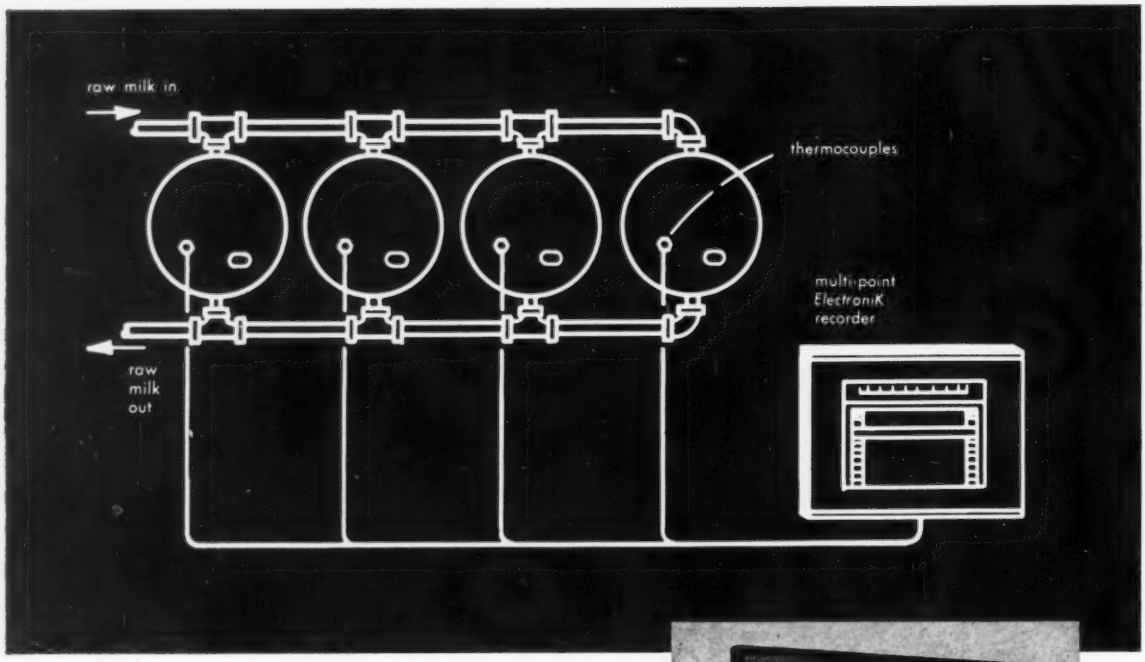


# Record 20 milk tank temperatures on one chart with this multi-point *ElectroniK* recorder

A single *ElectroniK* instrument can record all your temperatures. Twenty different temperatures can be recorded for a whole month without changing the chart. The recorder has a large easy-to-read scale. Different colors and numbers for each temperature measurement permit easy identification.

Two wires are all that connect the recorder to the temperature sensing point. These wires can be any length, enabling you to locate the recorder to suit your plant design. The sensing element, called a thermocouple, measures the temperature of the tank from the outside, so there are no clean-in-place worries.

Get complete details from your nearby Honeywell field engineer. Call him today . . . he's as near as your phone. MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.

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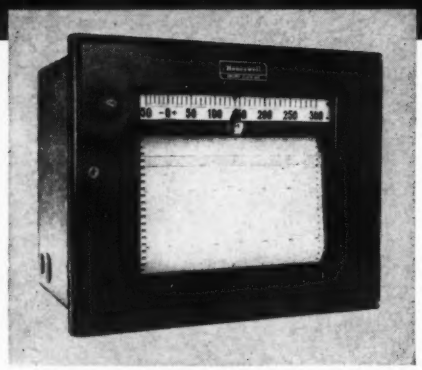
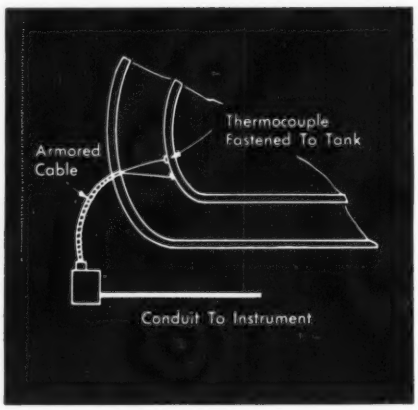





**Thermocouple sensing element** can be mounted on the outside wall of the inside shell as shown for a milk storage tank. Nothing protrudes inside the tank to interfere with cleaning. High speed of response of this sensing element permits the recorder to be located remotely.

ficing accuracy, machines employ multiple heads. Some even use a 2-station weighing system—first bulk feeds product to almost-desired weight, second dribbles to permit accurate cut-off.

Some units block product feed while a package is positioned for filling. Others divert product to a second bucket as first one is dumped.

Let's check performance of net and gross weighers: Their accuracy depends on design of scale and provisions to control product in suspension (between charges) and to stop flow instantly when reaching balance. Pivots and bearings must be designed to withstand millions of weighings a year. Beam's mass must be low if it is to respond rapidly to small weight increments.

Even refinements in electrical controls, operating a magnetic damper on a precision balance, have limitations and variations. Example is a solenoid (on 60-cycle current) that takes up to 1/120th sec. to close a gate. If scale is weighing 1 lb. in 3 sec., flow is over 5 oz./sec. or over 0.05 oz. in 1/100th sec. While this error seems small, an averaged minimum error (over and under weights) could run to thousands of pounds in several million packages.

Difficult-to-handle products cause inaccuracies. Sticky ones don't drop clean from net-weigh buckets and dusty ones gum up the scale. When gross weighing, variations in tare weight of packages lead to inaccuracies. Worst offenders are metal and glass containers. Even paper containers vary in their tare weights.

Big trouble-maker is a product's apparent density. As it varies, so does product's rate of flow. One solution is to use new bulk-density gage (346) that employs a radioisotope source, a detector (to measure density), and an electronic feedback (for automatic adjustment of weighing machine).

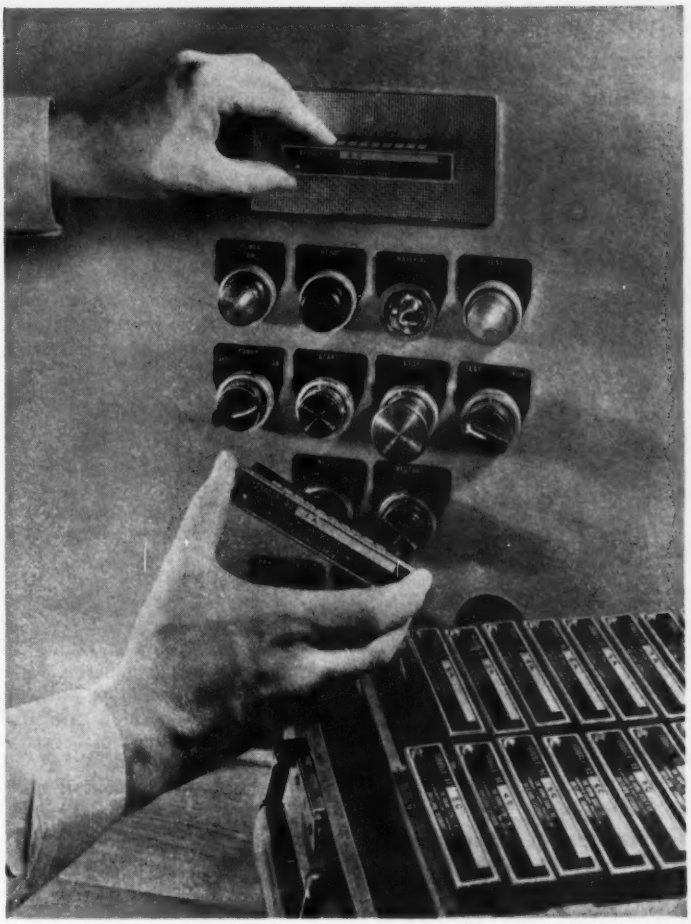
Closer tolerances in weight-filling, in combination with higher speeds, have been targeted in some of the new machines. For example:

Air-gap weigher (347) employs an old principle (of pneumatic control instruments and air gages) that checks precise dimensions of metal parts. As applied to 4-head, pneumatic-weigh carton filler, it senses the change in gap through which a minute air stream is pressure-directed. Less air escapes as gap narrows, and back-pressure builds up in jet.

Gap is narrowed by scale beam (fixed at one end, free at other) that is deflected by product's weight. This pressure build-up operates an air relay to actuate a shutter that stops product flow to bucket attached to cantilever-beam assembly. Then, by cam action, product is dumped into the waiting container.

Continuously balanced, cantilever-beam assembly moves only a few thousandths of an inch during scaling. Pneumatic sensor picks up beam deflection in millionths of an inch, weighs within hundredths of an ounce. System offers unusual accuracy, coupled with fast dependable action.

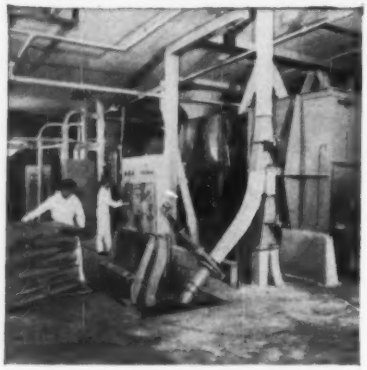
Gross weigher (348) accurately bags difficult-to-handle and free-flowing materials in 25- and 100-lb. lots at 6/min. Scale feeds directly into bag suspended from weigh beam (instead of through a hopper). Technique keeps product continuously in



**HOW BATCHPLUG WORKS: When start button on control panel is jabbed, signal channeled through plug starts flow. When desired amount runs into weigh hopper (or is directed through meter for blending), plug switches off first ingredient, starts to draw second until desired amount is reached. Sequence continues until all ingredients have been measured (in their pre-set amounts) for batch. Plug then empties weigh hopper (or blending reservoir) from which materials proceed to further processing. Batchplug panel automatically resets, starts new cycle beginning with first ingredient. Changeover from formula to formula is accomplished by removing plug and inserting another. (368)**

***Problem:***

**To boost starch and gum production while cutting operating costs**



***Solution:***

**SPROUT-WALDRON**

**UNIT MACHINES AND SYSTEMS**

When Morningstar Paisley executives decided to move activities to their new plant at Hawthorne, N. J., they demanded a system meeting these specifications: extreme versatility, no dust nuisance, protection against contamination, low handling and operating costs, stepped up capacity.

The answer was found in a packaged processing system involving Sprout-Waldron machinery for crushing, mixing, grinding and sifting; plus a series of four negative pressure pneumatic conveying systems.

Blending and bagging of starch, gum grinding and gum granulation are now being accomplished with a minimum of handling and maximum of efficiency. Operating costs are down, capacity up. For the full story ask for Bulletin F-19.

CW/107

SW SPROUT-WALDRON

Muncy, Pennsylvania

Size Reduction • Size Classification • Mixing
Bulk Materials Handling • Pelleting


## WEIGHING REPORT

motion, eliminating build-up and erratic discharge.

Weighing cycle is pushbutton-started to open air-operated gate at scale's infeed and to operate feeder motor. Feeding is also started by limit switch in series with gate and mounted to bag holder. Gate closes and feeder stops as pre-set weight is approached and beam moves toward balance. Bag is then released.

Net weigher (399) features product and package versatility, weighs and fills free- and semi-free-flowing products into bags, jars, cans, or cartons. It takes about 30 sec. to replace snap-on discharge spout when switching from one package to another, 1 to 4 min. to change charge weight, and about 5 min. to switch products.

Unit consists of overhead hopper, from which product is "gated" to vibrating trough-type bulk and dribble feeders. Cut-off gate stops both feeds as charge in bucket reaches pre-set weight.

Fill-by-weight control system (St. Lawrence sugar) employs limit switches to regulate two cubed sugar feeders. One switch controls flow from belt conveyor to counterbalanced hopper attached to pivot arm. When filled, hopper lifts counterbalance from operating arm of switch that stops belt feed. Empty hopper then trips, lowering counterweight to close switch that starts belt to re-feed hopper.

Second switch in package filler controls vibrating feeder. When carton is filled, scale trips to actuate switch that stops feeder. Switch is released to re-start feeder as machine brings next carton onto scale.

Motorless weigh-filler (350) is gravity operated to handle free-flowing products. Hopper-fed product flows to top compartment of revolving 3-compartment weigh hopper. When latter's beam is balanced, a latch releases to rotate hopper unit one-third of cycle, and weighed material is then spout-discharged into container. Hopper unit rotation turns up empty compartment for next charge.

Precision scale (351), electronically controlled, gives high accuracy in small weigher-filler for dry materials. Dials regulate feed and accuracy, enable instant checks.

Pillow-style packager (352) handles free-flowing materials that are elevator-fed to battery of net weighers. Machine forms pouches from roll-fed stock, fills them with scaled product.

### Newest Checkweighers

To double-check packages, more efficient units have now been devised.

Weight calculator-recorder (353) that also totalizes over and under weights is being used in a flour mill. Bags (5-lb.) are conveyed from filler to random-sample selector that whisks every 14th bag to check-scale, then returns it to line.

Here, a selector actuates a limit switch which, in turn, trips a 28-toothed ratchet wheel with pins mounted on the 14th and 28th tooth. The 14th bag moves wheel so pin triggers solenoid air valve, operating air-driven ram that pushes bag off belt onto scale. Weight is transmitted to strip-chart recording calculator. As ram reaches end of stroke, it actuates a second ram that returns bag to belt. Both rams then retract.

A 60/min. unit checkweighs packages (up to 32 oz.) with $\pm \frac{1}{16}$-oz. accuracy (354). Unit's conveyor comprises approach, weigh, and motorized take-away sections, as well as double-diverting gate that rejects out-of-tolerance packages.

Another unit makes 120 weighings/min., supplies binary coded output signal to auxiliary units that record, classify, and feed back corrections to filling machine (355). Employs even-balance lever and weight indication by optical light-projection system. Electronic control is through direct-reading crystal photocells mounted alongside optical scale dial.

Automatic weight checker (356) requires only simple turning of dial indicator and registering to designated weight sets in handling cartons, bags, and drums (10-200 lb.) on high-speed filling line. It shows exact weight, counts number of packages, rejects "unders" and "overs," and prints records. Scale

employs conveyor suspended from leverage system. Controls permit interlocking with other conveyors.

Electronic unit (357) checkweighs small packages as well as 50-200-lb. bags or shipping cases. It features weight zones, visually indicated by counters or panel-mounted lights.

High-speed checkweigher (358) operates at 275/min. It comprises positive, gentle, 3-way package segregation, requires no changeover for varying package sizes.

Conveyor-line checkweigher for large bags and shipping cases (359) indicates and counts over-under-and-on weights, handles data in tabulated digital form. Electronic impulse from scale actuates conveyor for stopping line, rejecting and marking short-weight packages.

Electronic weigher for sliced bacon (360) is hooked to slicing machine to reduce give-aways. Shingles are conveyed on belt-part of sensitive balance. As slices reach pre-set amount, balance tilts and closes circuit, sending electronic impulse to hydraulic device that stops slab feed.

Forward movement of slab is stopped within ¼ revolution of slicing knife (0.015 sec.). Complete slicing for 1-lb. package occurs within a second, keeps accuracy to 5% at checkweighing stand. After unit of sliced bacon moves off belt, a second electronic component—timed with knife revolution—starts slab forward to eliminate half-slices.

Weighing-belt speed is adjusted to give shingle spread of 5-7½ in. to fit different sized paperboards. Interval between shingles is also varied to increase or decrease production speed by altering "firing" time in electronic system. Unlimited control of slice thickness is provided by vernier that acts on slab-feed mechanism.

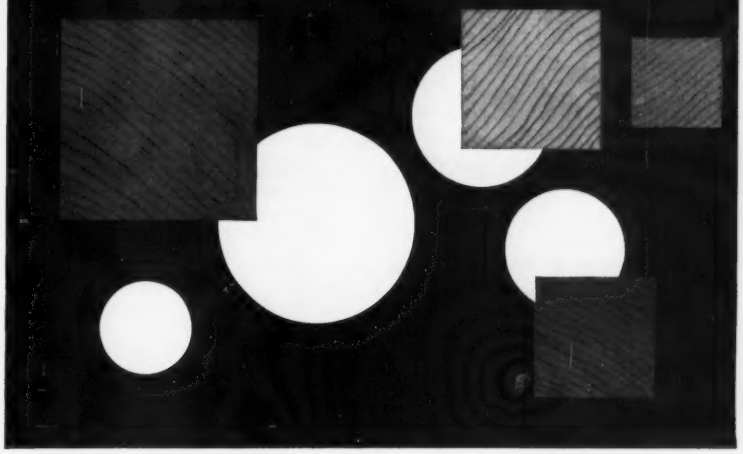
Package-weight variations caused by changes in product density are reduced by an air pressure checkweighing system (361) built into a volumetric filler. It comprises: (1) Checkweigher, (2) volume adjuster (simultaneous action—through reversible motor—changes volume of all filler's measuring flasks), and (3) weight recorder-controller (operating on signal from checkweigher to actuate volume-adjusting motor).

## Types of Scales

Here's a brief description of the many types of scales used in the food industry:

1. **Truck scales**—available in two and four sections and incorporated in concrete pit. Platform is big enough for all wheels of truck or


How many of Your Scales are SQUARE Pegs in ROUND Holes?

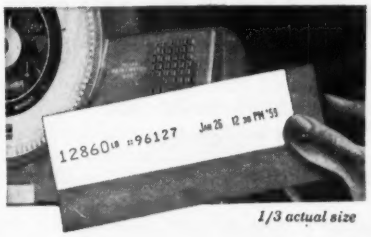


**Accuracy alone is not enough ... Scales must *fit the job***

Scales that were right for their jobs in your plant yesterday may be "misfits" today. This can easily happen as a result of *changes* in plant layout, materials handling, inventory controls, or in value or quantity of materials weighed.

And misfit scales can bottleneck production, infect your weight records with costly errors, slow down materials handling, undermine inventory controls—product quality—customer goodwill!

Be sure your scales are not just 100% accurate, but 100% *adequate*, too. We will gladly arrange for an adequacy test to cover any or all of your scales. A few minutes at each weighing station will give you the facts on scale capacity and location, dial visibility, platform size and height and other factors that determine *scale adequacy*. Address: TOLEDO SCALE, Division of Toledo Scale Corporation, Toledo 12, Ohio.



*1/3 actual size*

**NEW TOLEDO PRINTWEIGH "400"**

Prints **complete** weight records on tickets or sheets, also on strips. Full-figure printing, even when unit weights are used. Positive weight identification, with selective numbering, weight symbols, or consecutive numbering. Time and date printing available. Transmits weight data for recording by remotely located office machines, if desired. Ask for Bulletin 2017.

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CIRCLE 107 ON READER SERVICE CARD 107

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Grandma's recipes were a pinch of this and a dibby-dab of that.

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And you get just this and more with W&T's Merchen Scale Feeders and Meters. They control or measure feed rates by weight. There's no guess work. You get exactly what you set the equipment for . . . yields are known; quality is controlled.

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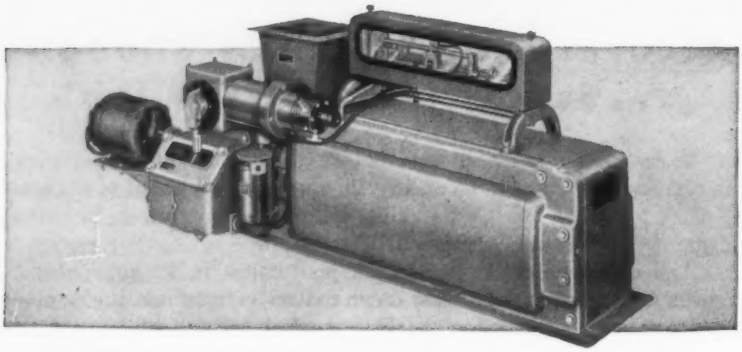

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# WATER ISN'T CHEAP ENOUGH TO WASTE

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## WEIGHING REPORT

trailer, thus saving time in spotting. A variation is the open-deck truck-dump scale. One is equipped with dumping lift that tilts platform to speed-unloading.

**2. Truck axle load scales**—modifications of above used for heavier loaded axles of trucks and trailers. They provide data on load distribution that is vital for controlling operating costs and tire wear.

**3. Permanently installed floor scales:** These are of full-frame (cabinet and platform supported by scale frame) and semi-frame (frame supporting only platform) type. Both have self-supporting lever system—part of scale frame—for weighing heavy loads. Capacities (with minimum graduations of 8-oz.) range to 3 tons.

**4. Built-in floor (warehouse) scales** are similar to above-mentioned floor scales, except that supporting levers handle loads to 10 tons. They're installed on fulcrum stands, with load transmitted from any of four points to lever system.

**5. Portable platform and bench scales:** Here, floating platform is mounted on an iron base attached to wheels. Units are equipped with many accessories, such as counters, charts, recorders, and photo cells and switch cut-offs for compounding, batching, etc.

**6. Ratio counters**—Principle here is to balance counted number of identical items against batches at given ratio.

**7. Overhead track scales** weigh moving products suspended from monorail or overhead trolley. They operate by suspending section of track or rail from lever system. Steel rod and counterbalancing mechanism provide indicator actuation (through automatic dials or beams).

**8. Hanging scales:** These are of spring or level type, with automatic dial or beam indicators.

**9. Hopper scales** are permanently fixed, and are manually or automatically operated in the weighing of large quantities of drys or wets. They're either suspended or floor-mounted stationary or traveling types. Equipment includes switches (mercury or magnetic), photo cells, electronic controls, interlocks (electrical or mechanical), printers, recorders, and remote panel controls (automatic or manual).

**10. Conveyor scales:** These, too, weigh materials being conveyed, without product flow stopping or slowing. Influencing their performance are variations in material load

# Flocks of turkeys trot on Koroseal

**BULLETIN: B.F.Goodrich has Food and Drug Administration and U.S. Dept. of Agriculture clearance on conveyor belts for every food-handling use.**

THOSE turkeys are all cleaned, weighed, ready for market except for the hot water bath they get at the end of the conveyor line to shrink their plastic sacks. Turkeys by the thousands are processed here, but at one time there were problems. The hitch was the canvas conveyor belting being used. It absorbed pungent grease and fat, was practically impossible to keep clean, developed into an eyesore, had a short life span.

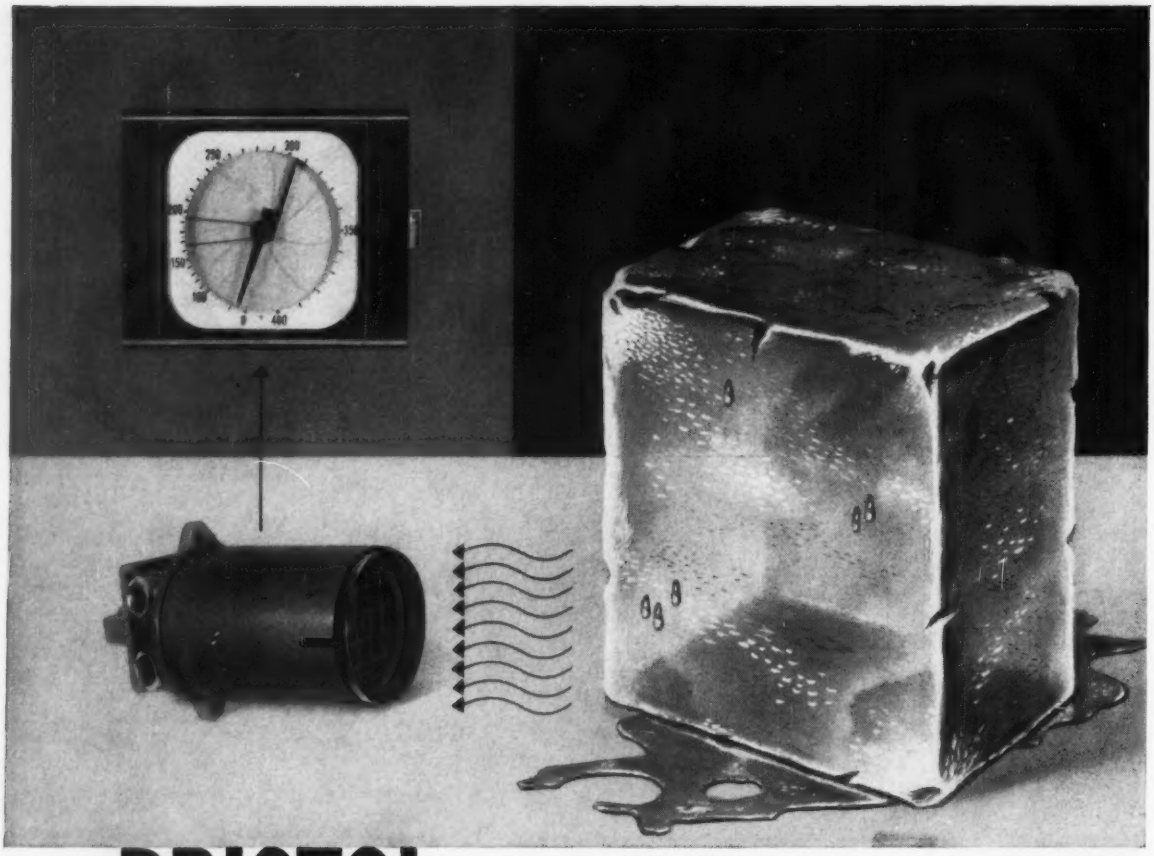
Then B.F.Goodrich introduced a new, improved belt for food handling —a belt made of Koroseal flexible material. Koroseal defies the things that ruin other conveyor belts—oil, grease, animal fats, most acids. It resists cracking and peeling, never gets soft and sticky. Koroseal doesn't absorb odors from food, has no odor or taste itself to transfer to food.

The turkey farm owner liked what he heard about the Koroseal belt, decided to give it a try. That was in 1955. Today, the same belt is still going strong, still looks as good as new. Since grease and fat can't soak into the smooth, polished surface of the Koroseal belt, it can be thoroughly cleaned in just a fraction of the time it took to scour the old belt.

For information about BFG food-handling belts, ask a B.F.Goodrich distributor for a copy of the "Conveyor Belt Selector" or write *B.F.Goodrich Industrial Products Company, Dept. M-813, Akron 18, Ohio.*

Koroseal—T. M. Reg. U. S. Pat. Off.

**B.F.Goodrich**



# new BRISTOL low-range radiation pyrometer

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...and many other substances; web processes or products; conveyed, rolled or extruded products; and stationary objects.

**0-200° F and other ranges to 1100° F • Direct reading charts, scales in F or C • Calibrated interchangeable head units • Automatic built-in ambient compensation • Easy emissivity compensation**

Here's the first radiation pyrometer that really gets down to 0° F.

It's the Bristol Velotron Pyrometer System—so sensitive you can sight the radiation unit (at lower left above) on your hand and get an accurate temperature indication.

And on the high end, spans and ranges are available up to 1100° F or corresponding ranges in degrees Centigrade.

Charts and scales are direct reading, in degrees F or C, even on the lowest ranges. No laborious calibration runs, calculations; no curve consulting needed! And you get famous Bristol Dynamaster* Recorder accuracy —proven in thousands of installations.

Ambient temperature compensation is automatic, completely contained in recorder unit (no third unit needed), and allows use in ambients up to 135° F.

A simple knob adjustment allows compensation for emissivity characteristics of target material from black body on down.

Interconnection cables are standard copper wire; no special, preselected lengths required.

Write for complete technical data on this outstanding new Bristol contribution to industrial pyrometry. The Bristol Company, 115 Bristol Road, Waterbury, Conn. 9.31

*T. M. Reg. U. S. Pat. Off.

**BRISTOL**...for improved production through measurement and control

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

and belt speed. Totalizing of material is achieved electrically (with counter, transmitter, and belt-speed compensator) or mechanically (scale beam counterbalancing belt load, and scale levers supporting belt idlers).

**11. Automatic batchers:** These include automatic hopper-and-conveyor batching scales. Weighing actuates control devices to make batching repetitive enough to be almost continuous. Multiple scales are electrically interlocked (usually through time cycling). System comprises feeders (to regulate product flow), weigh hopper (or conveyor), weighing mechanism, and controls (linked with weigher to open and close feed and discharge gates).

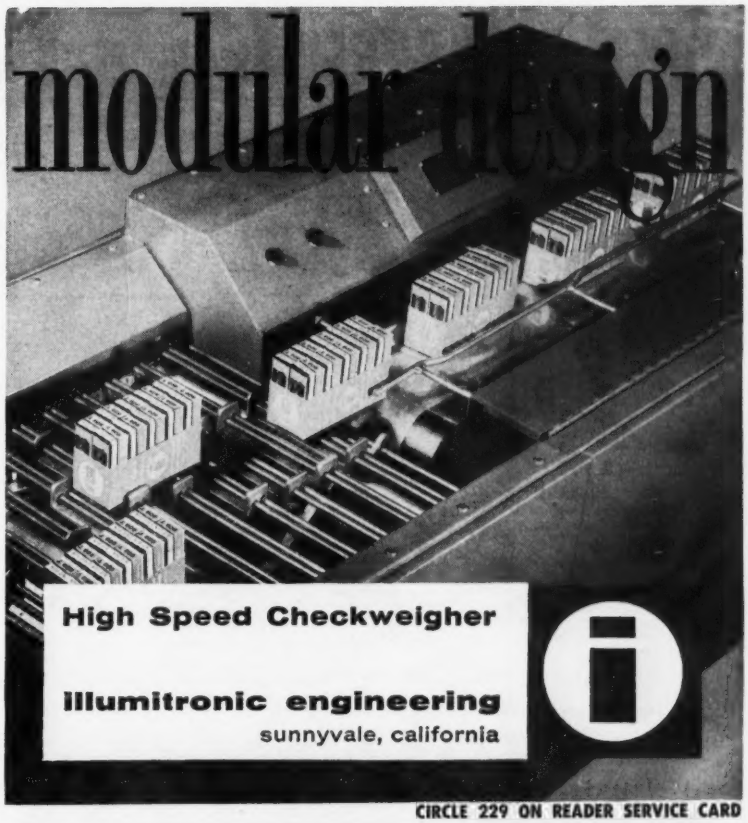
**12. Continuous weigh-feeders** batch a single ingredient or continuously proportion several. They comprise feed hopper, endless belt, and scale beam connected to hopper gate.

**13. Over-under scales:** These are of pre-determined weight type, with indicator for easy, quick, accurate reading. They're extensively used to fill and checkweigh filled packages.

**14. Net weighers-fillers:** Here scales are equipped with single or multiple weigh hoppers, from which product is discharged into package. Basically, products are gravity fed, weighed, and tripped when counterbalanced.

**15. Checkweighers:** Over- and under-weight packages are controlled through use of continuous units. Here, automatic scales are equipped with electronic controls to form integral part of conveyor line without interrupting production flow. Packages pass over weighing section for checking. If weight is on target, packages proceed to casers. Those not making weights are mechanically rejected.

*Acknowledgment: The author expresses appreciation to the following for their aid in preparation of this Special Report: Dave Treganowan, Calgon Co., Pittsburgh; S. T. Brinton, FMC Packaging Machinery Div., Stokes & Smith, Philadelphia; K. M. Peterson, Pneumatic Scale Corp., Quincy, Mass.; H. Bandstra and J. K. Rudd, Richardson Scale Co., Clifton, N. J.; T. C. Housley, Toledo Scale Corp., Toledo, Ohio; C. A. Rowe, Wallace & Tiernan, Inc., Newark, N. J.; H. C. Smith, Wright Machinery Co., Durham, N. C.; L. A. Langevin, The Howe Scale Co., Rutland, Vt.; and C. F. Doepke, Fairbanks, Morse & Co., Chicago.*

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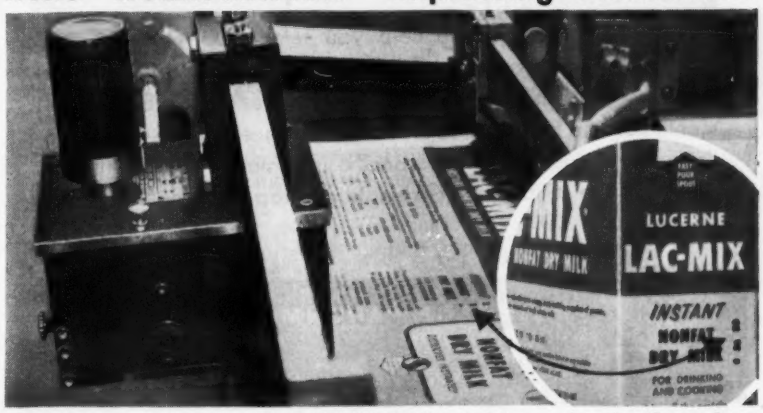


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# Patapar® offers a full range of F.D.A. Accepted wrappers and liners.

All food packagers affected by the 1958 Food Additives Amendment to the Federal Food, Drug and Cosmetic Act will find it easier to achieve F.D.A. Accepted packaging by using Patapar. While Government scrutiny of food packaging grows more intense, Plain Patapar Vegetable Parchment can still offer absolute purity. *That's because there aren't any additives in Plain Patapar.* This Vegetable Parchment is a dense, fiber-free cellulose . . . whose *natural* qualities are purity, wet strength, grease and moisture resistance, good separation characteristics, and remarkable toughness. Furthermore, these qualities can be provided in varying degrees according to need.

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### New Wheat Protein Test Is Reliable as Kjeldahl

A simple, rapid method for determining protein content of wheat and flour, that is said to be as reliable as the Kjeldahl analysis, has been developed by 2 Agr. Marketing Service scientists.

Method is based on use of sulfosalicylic acid solution and a colorimeter. Protein is separated from sample and suspended in acid solution, then a photoelectric measurement is made. Through use of equations or prepared tables, colorimeter reading is interpreted in terms of protein content.

Process works well with any pure wheat sample, regardless of where it is grown and under what weather and soil conditions. It is extremely important, however, that sample be ground to uniform particle size.—*The Hook-Up*, (Pub. by Millers' National Federation, Chicago), Dec. 31, 1959.

### Radiation Preservation Non-Toxic, Say Reports

There is no evidence of any toxicity in irradiated foods for either man or animals.

Army radiation preservation reports to Surgeon General support this belief and also state that no ill effects on growth, reproduction, and longevity could be directly traced to irradiated foods.

In addition, although experimental studies show that irradiated beef produced hemorrhages in rats, bleeding is reported caused by effects on vitamin K, suggesting a nutritional rather than toxic effect. Studies noted that addition of vitamin K to radiation-fed rats prevented hemorrhaghing.

Also cited are repeated experiments which prove that blindness in rats is no more associated with irradiated than nonirradiated foods and that each is equal in nutritive value.

Other cases of inconsistent and misleading findings are noted in experiments on sterility in dogs and heart defects in mice.—*Nucleonics*, 112-17, Jan., 1960.

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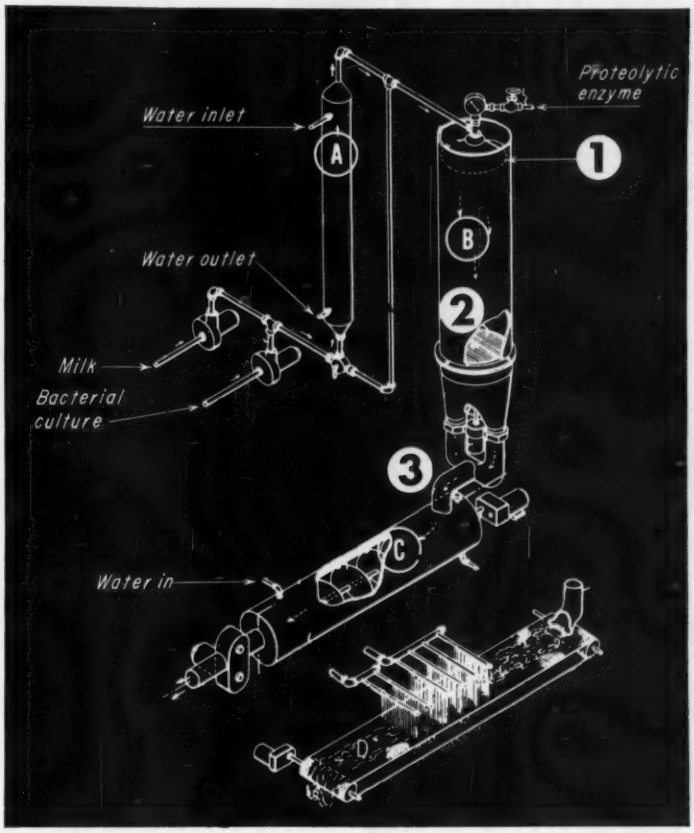
**Dairy Courses:** Michigan State U.—Fourth Milk Concentrates Conference, March 23-24; U. of Illinois—Dairy Technology Conference, April 12-13.




## Apparatus Makes Cheese Continuously

Commercial production of cottage cheese and numerous other varieties on a continuous, automatic basis is the object of the recently patented device illustrated above.

Operation starts when milk and culture are fed in desired proportions, by the 2 positive displacement pumps (top left), into sanitary pipe line supplying water-jacketed retaining chamber (A). A 3-way valve in the line enables part, or all, of the milk-culture mixture to bypass this chamber when desired.

From (A) mixture flows to coagulation tank (B). As it enters top of this tank, proteolytic enzyme and, when desired, color and $CaCl_2$ solutions, are metered in. These are incorportaed as mixture trickles slowly down over cone (1) and is distributed over top of fluid in (B). Coagulation takes place as mixture moves downward, forming a solid mass by the time it reaches cutter (2) which forms it into small cubes. These cubes are slowly agitated to prevent matting as they move to discharge pipe (3) which transfers them to cooker (C) at a rate equal to feed into top of tank.

Cooker is water-jacketed to provide desired temperature, and equipped with motor-driven auger that moves curds and whey to discharge pump. Where whey is to be removed immediately and curds washed mixture is discharged to wire mesh belt (D)—U. S. Patent 2,917,827, Dec. 22, 1959.

### Speeds Meat Testing

Taking the guesswork out of tenderness as a measure of meat quality is the object of a new USDA test that can be applied to either the cooked product, or raw meat right out of the slaughterhouse.

To perform the test, sample is

**SA**—streamlined balloon jacket design. Extra large diameter provides greater heating surface. Sizes 15 to 500 gallons. Constructed for steam working pressures of 40, 90 and 125 pounds.

**SA MIX COOKER**—has single or double motion agitator with or without hydraulic lift. Agitator lifts easily and smoothly out of cooker. Sizes 30 to 500 gallons.

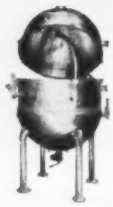
**CW**—designed to process batches up to 150 gallons. Positive worm gear. Handwheel gives control of capacity loads while tilting. Large diameter kettle gives fast even cooking.

# BUILT-IN QUALITY

## . . . IN HAMILTON SPECIAL OR STANDARD KETTLES ASSURES LOWER PROCESSING COSTS

**PC**—stainless steel pressure cooking kettle for meat and poultry processing. 90 p.s.i. in jacket and 15 p.s.i. in kettle. Quick opening latches. Top is lifted by eccentric lever. Sizes 30 to 250 gallons.

**HV**—vacuum cooker from 150 to 500 gallons. Hinged manhole provides access to the inside. Available with a mixer—circulator can be installed to increase heat transfer and agitation.



**VT**—vacuum cooker has no equal for small batches. Tilting top easy loading. Sizes 30 to 150 gallons. Jacketed for 90 p.s.i. steam working pressure.

**SPECIAL**—PC Style Pressure type mix-cooker. Jacket to full 200 gal. level. Plate type heating-cooking coils arranged to act as agitator baffle plates. Entire unit removable for easy cleaning.

Hamilton offers the right kettle for any mixing or cooking job. The Cost? Reasonable and economical in the light of finished and polished fabrication. Sanitation guaranteed. Careful competent workmanship and constant inspection assures you of quality that is built-in. We'll work from your prints or create them for you on our drawing boards. Write for free Hamilton Kettle Catalogue.

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## Advances in Technology

placed in a special cylinder with a small hole in its bottom. Then cylinder is placed in small hydraulic press and pressure applied.

Reading on the gage, when meat begins to extrude through hole in cylinder, indicates toughness or tenderness of sample. Readings up to 200 psi. mean a tender cut; 200-300 moderately tender, and over 300 tough.

Results of tests performed by this method on beef cooked after 10 days aging, and on raw beef aged 3 days, compared favorably with results obtained by the Warner-Bratzler mechanical shear method, and with taste panel evaluations.—*Agr. Marketing*, (USDA Agr. Marketing Service, Wash. 25), 6-7, March '59.

### Submerged Fermentation Ups Vinegar Yields

Cider, wine, malt, or spirit vinegar can be made by submerged fermentation in an apparatus (made in Austria) that disperses air through the mash by means of a motor-driven rotor.

Apparatus is known as the Acetator and one (Type 600), with a normal filling height of 24,000 liters, uses 85 cu. m. (about 3,000 cu. ft.) of air per hr. and 8.5 kwh. of power, to produce 36-kg. of acetic acid. Cooling water is required, the amount depending on its temperature.

Fermentation proceeds down to 0.3-0.1% alcohol. Yields are 10-15% higher than by the usual generator systems for cider, malt, and wine vinegars; 5% higher for spirit vinegar. A mash containing 8-12% alcohol by volume converts in 48 hr.; 24 hr. are sufficient for lower alcohol contents.—*Ind. & Eng. Ch.*, 51(10), 1279-80, 1959.

### Time-Temperature Curves Aid Gelatin Studies

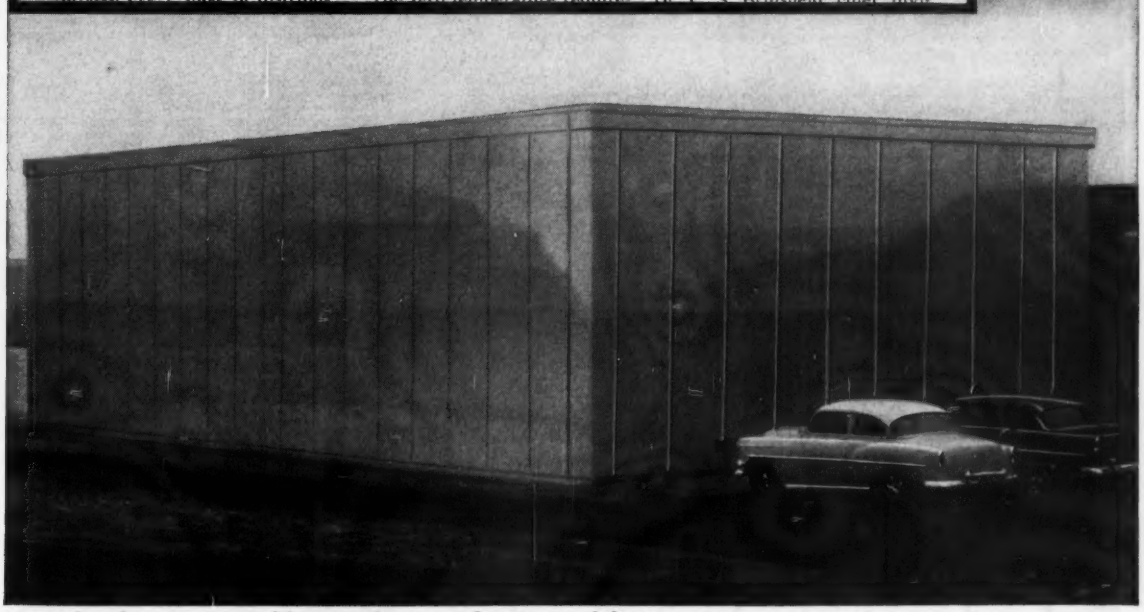
Cooling and heating time-temperature curves of 6 gelatins (3 acid- and 3 alkali-extrated) have been used to study formation of gels and their breakdown.

A mechanism that explains the behavior calls for a 2-stage process that first sets up primary intermolecular linkage sites along the gelatin chain, the number being a function of molecular weight. Secondary bonding then occurs at sterically suitable points within primary gel structure. Secondary linkages are temperature-labile and their effect on gel rigidity decreases rapidly as

PACKER MEET HEARS

## Food & Drug Code Calls for Maximum of Zero In Retailer Warehouses, Trucks, Store Cases

A standard zero temperature for frozen food products through every stage of distribu- Association of Food and Drug Officials of the U. S. The zero temperature require- Packers convention in Chicago. Making the presentation was Dr. C. S. Brinsfield, chief, divi-

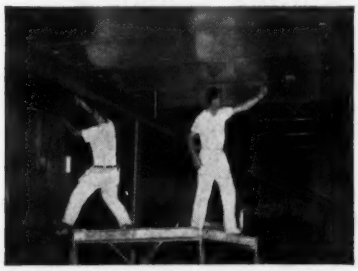


Mounted outdoor on concrete slab, Armorply rooms reflect away sun's heat.

# Looking for economical sub-zero storage?

**Cold storage rooms made of prefabricated Armorply modules go up fast with ordinary labor; maintain temperatures down to —100°F.**

**Cut installation costs.** Armorply coolers can be installed directly on concrete slab, indoors or outdoors. In installation of freezing rooms, insulated floor sections are used. No masonry or other costly, space-taking construction is needed. And because the room can be installed quickly, you save on labor costs, too.



Patented joint-locking device speeds installation, gives air-tight protection.

**Cut maintenance.** Armorply — metal-faced plywood — never needs to be painted and it wipes clean easily. Strong, highly impact-resistant Armorply minimizes the need for repairs; yet if damage should occur, single panels can be replaced.

**Cut installation time.** Armorply modules, as prefabricated by the Freezer Box Division of Annapolis Yacht Yard, Annapolis, Md., have a patented joint-locking device that eliminates sealing problems. Rooms can be assembled, expanded, dismantled and moved quickly with ordinary labor.

**Give safe, sure temperature control.** Armorply rooms maintain constant temperatures, warm or cold. Armorply will not absorb odors, and the modules' air-tight fittings afford complete protection against vapor and vermin.

Armorply, metal-faced Weldwood waterproof plywood, comes with faces of aluminum, stainless steel, zincbond steel, copper, or any other metal laminated to a variety of core types. Send the coupon for details and your free sample of Armorply.

**WELDWOOD®**
**ARMORPLY®**
Metal-Clad Plywood
*Product of*
*United States Plywood Corporation*

**United States Plywood Corporation**
**55 West 44th Street, New York 36, N. Y.**
FEI-60

☐ FREE: Please send me an Armorply sample and descriptive booklet, "Facts About Weldwood Armorply."
☐ Please have your representative call with full details.

Name.....
Firm.....
Address.....
City.....Zone...State.....

Using seven C&K Wrap-Kings, Drake's packages both their 2½-oz. and 12-oz. coffee cakes at the rate of 65 and 72 units per minute respectively. Machines are capable of top-efficiency performance of 80 packages per minute without unwanted crumb build-up.

C&K Wrap-Kings keep pace with high-speed production line which turns out 1200 cakes every 75 minutes.

# C&K WRAP-KINGS at Drake Bakeries help boost sales 300%...up production 100% ...reduce labor costs 75%

"The WRAP-KING machines have produced sales magic for our popular coffee cake line," says John Mollenhauer, Brooklyn Plant manager, Drake Bakeries. "Thanks to the high display appeal and consumer acceptance of the new cellophane package C&K machines turn out, sales have skyrocketed by 300%. In addition, there has been a 100% gain in productivity and a 75% reduction in labor costs due to the complete elimination of overtime work. And WRAP-KING machines prevent crumb build-up, the bane of all bakeries."

Drake Bakeries' highly successful experience with C&K machines is typical. In case after case involving both wrapping and automatic can handling, versatile Crompton & Knowles equipment has solved complex packaging problems, increased production and reduced costs. When you encounter packaging difficulties, either in wrapping or can packing, consult C&K. You can get full details, including leasing information, by writing Crompton & Knowles Packaging Corporation, Holyoke, Massachusetts.

CROMPTON & KNOWLES
C&K
PACKAGING CORPORATION

**Stands out in PACKAGING**

***National Sales and Service Offices:*** NEW YORK • CHICAGO • LOS ANGELES • ATLANTA • DALLAS • CLEVELAND • BERKELEY, CALIF. • SEATTLE • OGDEN, UTAH • WINTERHAVEN, FLA. • TORONTO • MONTREAL

temperature nears gel melting point. Rigidity of gel may be controlled by number of sites available for secondary bondings.—*J. Science Food & Agr.*, 10(7), 394-400, 1959.

### Protein Content of Chocolate Best Guide to Milk Solids

Careful measurement of nitrogen fractions of Dutch milk powders has resulted in a method of estimating milk solids content of chocolate products that is more reliable than the conventional formula using butterfat and lactose contents.

Extraction of the chocolate with 1% sodium oxalate removes milk proteins. These may then be precipitated for nitrogen determinations with tannin and acetic acid. The factor for conversion of nitrogen to milk protein by this method varies slightly with the method of making the milk powder used in preparing the chocolate.—*International Choc. Review*, 14(12), 536-40, 1959.

### Frozen Food Indicator

A device to be embedded in a package of food to be frozen that will indicate thawing is the object of a recent patent.

Device comprises elongated transparent container having slidable piston situated over a spring that is biased to exert force to advance the piston, and a liquid whose freezing point is about that of the food.

Liquid expands on freezing and releases piston from its seat but confines the spring while product remains frozen. When thawing occurs, spring is released.—U.S. Patent 2,915,405, Dec. 1, 1959.

### New Corn Chip Process

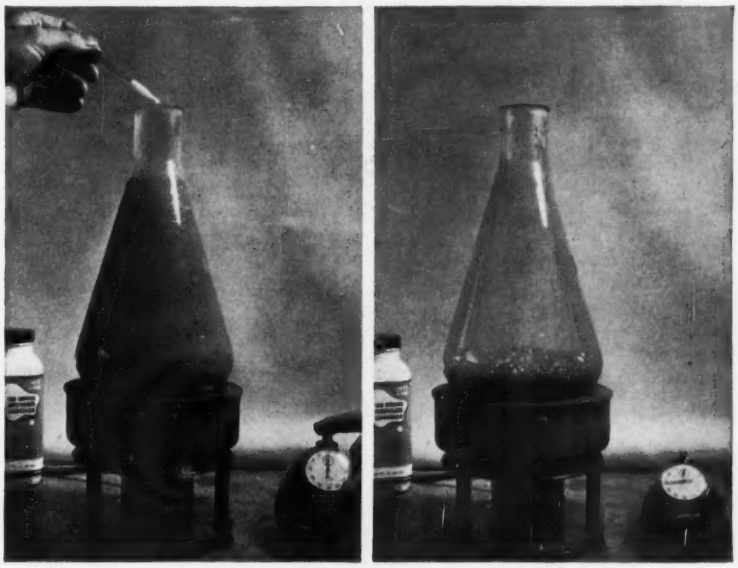
Improving the quality of corn chips is the object of a recent patent. In the process, yellow corn (10% moisture content) is heated to 170F. then allowed to cool to room temperature.

Corn is washed, drained and ground to form a dough that can be washed through a No. 20 screen —75% through No. 325 screen. Moisture content of dough is adjusted to 50%, then it is kneaded between oppositely rotated rollers spaced .014 in. apart.

Dough is stripped from rollers, cut to desired size pieces and dried at 675-725F. for 30 sec. Finally, the dried strips are fried for 30 sec. in shortening at 370F.—U.S. Patent 2,916,378, Dec. 8, 1959.

**SILICONE NEWS from Dow Corning**

# Stop Foam Fast



## Dow Corning Silicone Defoamers Increase Production, Cut Costs

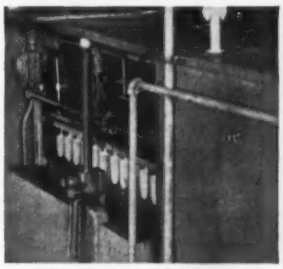
You can't beat Dow Corning silicone defoamers for foam control. Job-proved to be the fastest, most efficient and effective foam killers ever developed, Dow Corning defoamers speed processing time, reduce product waste, minimize maintenance and eliminate the chance of boil-overs and fire hazards.

IN WINE FERMENTATION

Easy-to-use Dow Corning silicone defoamers eliminate troublesome foam in the processing and packaging of foods, beverages, syrups and antibiotics. Highly effective at low concentrations, they knock down a mountain of foam and minimize recurrence, without contaminating the product.

Odorless, tasteless and physiologically harmless, Dow Corning Antifoam A may be used in nonstandard foods at concentrations up to 10 ppm; water-dilutable Antifoam AF Emulsion may be used at concentrations to 34 ppm.

Write for a FREE SAMPLE giving an indication of your foaming problem and whether it's in an aqueous or oil system. Address Dept. 5503.



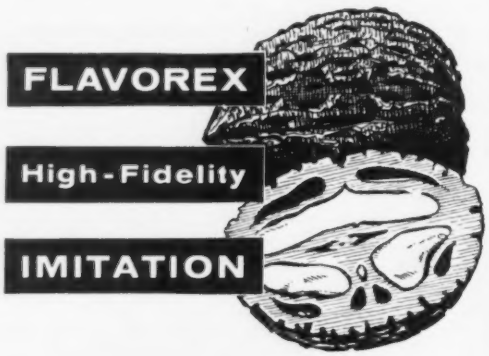
IN PROCESSING FROZEN BARS

first in silicones

**Dow Corning CORPORATION**
MIDLAND, MICHIGAN

ATLANTA BOSTON CHICAGO CLEVELAND DALLAS LOS ANGELES NEW YORK WASHINGTON, D. C.

# New finer flavor improves sales!




# BLACK WALNUT

## with exclusive Walnadyne

*--a synergistic compound that gives these advantages--*

- TRUER FLAVOR
- HEAT RESISTANT
- DISPERSES READILY
- GREATER STABILITY
- ECONOMICAL

**BLACK WALNUT NO. 2047**

Used ½–1 oz PER 100 LB. BATCH. Price per gallon **$12.50**

Symbol of Fidelity

*Better Flavors for Better Products*

**FLAVOREX CO., INC.**

302 S. CENTRAL AVE., BALTIMORE 2, MD.


# MEN & COMPANIES

**Campbell Overseas Push . . .** increased demand and potential for convenience foods abroad has prompted creation of Campbell's Soups International as a separate division of the company.

New president of the world-wide division, expected to better administer the company's increasing foreign business and make possible further expansion, is J. Paul Sticht.

He credits five factors for the increased demand: (1) Rapid post-war recovery, (2) growth of the "middle class," (3) rising living standard, (4) interest in better nutrition, and (5) attraction of American quality at no significant overall cost increase.

New division has companies in Australia, England, Italy, and Switzerland.

J. Paul Sticht

Thomas H. Sharp

**Package Appeal . . .** Introduction of a consumer take-home line and a window box-type, self-service outlet are two methods accented by Stephen F. Whitman & Son to boost market performance of its packaged candies.

Says Thomas H. Sharp, new company president: "Every effort is constantly being made to give the consumer the type of packaged merchandise he wants. And here, at Whitman's, continuous national advertising is informing the public of our product's quality and value."

The new president predicts a prosperous growth for the candy field in conjunction with an even stronger national economy.

## Personnel

**Thomas W. Biggs** will serve as Borden Co.'s research products coordinator in new asst. v.-p. post.

**W. E. Brownlee,** manufacturing v.-p. at Sunshine Biscuits, is now a board member.

**V. E. Christianson** assumes management of Pacific Molasses Co., San Pablo, Calif., succeeding retiring **John L. Caron.**

**Frank J. Daniels** is new marketing director at Durkee Famous Foods.

**Charles P. Grier** joins Dr. Pepper Co. as chief of quality control lab.

**Edward J. Hekman** has been elected president of United Biscuit Co. of America, succeeding **K. F. MacLellan, Sr.,** who will continue as board chairman.

**Paul H. Immekus** is newly appointed beverage-syrup national sales manager at Canada Dry Corp. **Edward J. Krauss** takes over similar post in canned beverage department.

**W. H. Kelly** moves up to senior v.-p. and director of sales at Bunte Bros. Chase Candy Co.

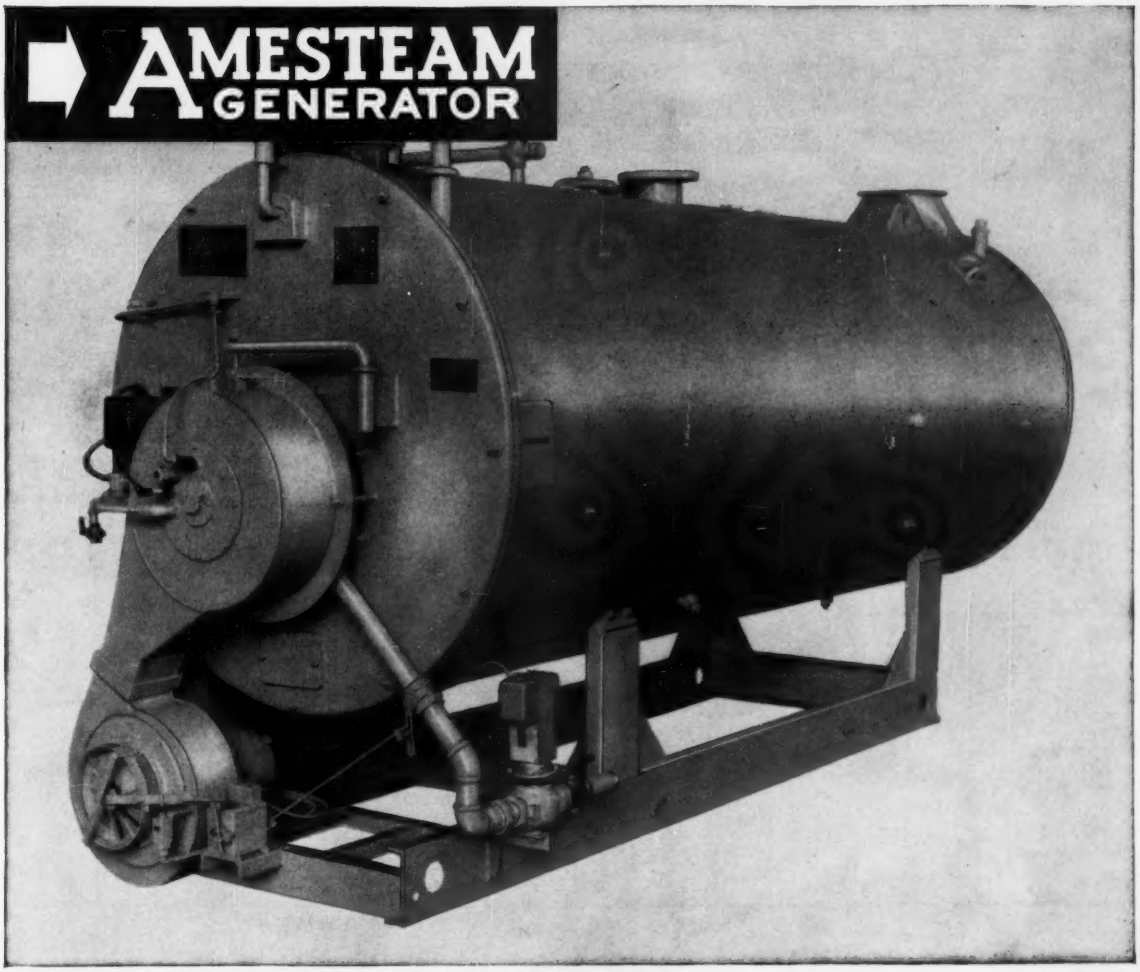
**Hilard L. Kravitz** has been named research v.-p. for Adolph's Food Products.

**Louis F. Long,** Cudahy Packing Co. president, is new board chairman of American Meat Institute Foundation.

**Mark A. Matthews** takes over Carnation Co.'s Fresh Milk & Ice Cream Div. as v.-p.

**Theodore G. Montague, Jr.,** succeeds Leo W. Bayles as Drake Bakeries president.

**W. B. Murphy,** Campbell Soup Co. president, joins the Business Advisory Council for the U. S. Dept. of Com-




# PERFORMANCE that brings REPEAT ORDERS again and again

An AMESTEAM GENERATOR in operation is our best salesman for another. In fact, many of our customers have ordered 10 and more units on the strength of past performance. And this, in spite of lower bids.

Why? Because the AMESTEAM GENERATOR owner knows he has a good thing. He knows he has a quality boiler with all the proved features necessary to give him the economical steam he wants *when* he wants it. He's seen how little maintenance labor the unit requires, and how flexible it is to changing load demands. He's also enjoyed the assurance of expert AMES service, on call 24 hours a day.

Specify AMESTEAM GENERATOR for your power — processing or heat requirements. You won't be buying a cheap boiler. You *will* be buying years of cheap steam.

*MAIL COUPON TODAY*

AMES IRON WORKS INC.
BOX B-30 OSWEGO, N.Y.

**AMES IRON WORKS**
**BOX B-30, OSWEGO, N. Y.**

Gentlemen:
Please send me further information on AMESTEAM GENERATORS and name of the nearest representative.

NAME.....

COMPANY.....

ADDRESS.....

CIRCLE 119 ON READER SERVICE CARD

CIRCLE 120 ON READER SERVICE CARD→

# GAYLORD POINTS OUT
## MANY WAYS YOU CAN SAVE IN PACKAGING

Gaylord uses a sharp pencil to survey your *total* packaging operation—checks those hidden costs that are frequently more important than the price of the box.

If you demand increased production, improved protection and important savings in corrugated packaging . . . call in your G-man. He'll help you erase any packaging errors, leave an indelible mark on the credit side of the ledger.

**CROWN ZELLERBACH CORPORATION**
**GAYLORD CONTAINER DIVISION**

Gaylord Boxes

IN CANADA • CROWN ZELLERBACH CANADA, LTD. VANCOUVER, B. C.

HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

merce. **Joseph B. Hall,** Kroger Co. president, has been named vice-chairman of same group.

**Dr. Charles M. Mottley** joins Stanford Research Institute as senior scientist and planning board chairman.

**Gordon Swaney** takes over new post of director of sales and marketing at LaChoy Food Products.

**Marcus M. Urann** is new president of Ocean Spray of Canada, Ltd.

**James H. Whitaker** now heads cake perations at Interstate Bakeries, Kansas City, as v.-p.

## Industry

**Butter-Nut Foods Co.,** Omaha, has purchased **Thomas J. Webb Co.,** subsidiary of **Continental Coffee Co.,** Chicago.

**Corn Products Co.** has made financial donations to 119 American colleges in recognition of their training and education of company personnel.

**Firmenich, Inc.,** N. Y. C. flavor producer, has entered into a long-term agreement with **The Glidden Co.** to distribute, on an exclusive basis, a number of aromatic products of latter's Organic Chemical Div. in U. S. and Canada.

**R. T. French Co.,** Rochester, N. Y., has purchased **L. C. Forman Co.,** Pittsford, N. Y., maker of food specialties.

**Hawaiian Pineapple Co., Ltd.,** stockholders will be asked at August annual meeting to change firm's name to **"Dole Corp."**

**Pepsi-Cola** has officially dedicated its new $7,799,000 world headquarters in N. Y. C.

**Smith Canning & Freezing Co.'s** President Milan D. Smith has been elected president of National Canners Assn.

**Sugar International,** the Hawaii-based triumvirate of **American Factors, Ltd.,** Honolulu, **J. H. Pomeroy & Co.,** San Francisco, and **Hawaiian Dredging & Construction Co.,** Honolulu, is making a strong push for international sugar business.

**JOHN H. KRAFT**

**Back In Business . . .** Former Kraft Foods Co. Chairman of the Board John H. Kraft is still "more than just active" in the food industry.

Although nominally retired (1956), he's now started a second business career involving development of a new snack food, Sesa-Teez sesame chips.

A new sesame seed processing plant in Paris, Tex., is turning out the new snack. Used here is specialized machinery designed to improve milling processes by overcoming age-old dehulling and cleaning problems.

Mr. Kraft combined his own name with "sesame" to name the new company—Sesa-Kraft, Inc. Firm now has national sales offices in Chicago.

Sesa-Teez chips are offered in a specially designed 6-oz. carton retailing at 39¢.


FOR NEW ANGLES IN PROCESSING

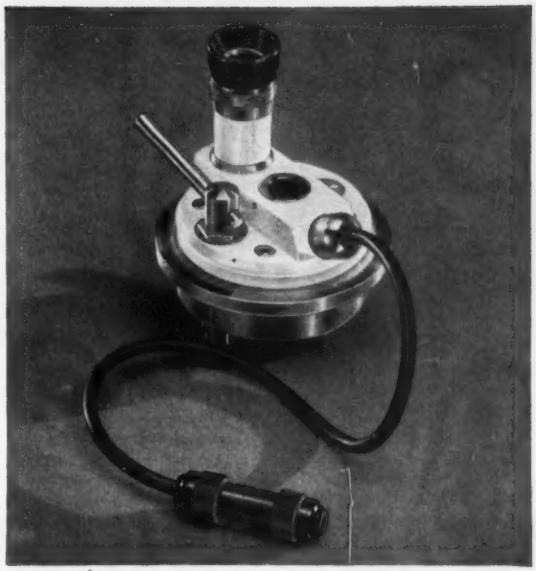
This close tolerance continuous mixer represents a major refinement in processing machinery. It is specifically designed for continuous flow operation. Inner members are stainless and it is equipped with heating or cooling jacket. We will be pleased to consider your handling problems. *Write for free brochure.*

ANTHONY

WILLIAM A. ANTHONY ENGINEERING COMPANY
9716 Madison Ave., Cleveland 2, Ohio

CIRCLE 231 ON READER SERVICE CARD





**AO's Goldberg Process Refractometer Prevents Waste . . . Increases Profits**

This in-stream Refractometer can be mounted in wall of process vessel, evaporator, vacuum pan, product pipe line or other location where continuous reading is desirable. Quickly determines total soluble solids in turbid and dark-colored concentrates such as jellies, jams, purees, juices and syrups.

1 **Prevents profit loss:** Determines exact endpoint of cooking batch by providing continuous, in-process readings of total solids. Prevents profit loss due to soluble solids "give away" by over concentration.

2 **Prevents product waste:** In-process readings on *hot* product eliminates old-fashioned external sampling with its consequent product waste and time loss. Savings in product alone, in most cases, will pay for the instrument in one season.

3 **Prevents errors:** Since product is always tested in-process, errors due to evaporation, temperature changes or opacity are eliminated. Readings are not affected by viscosity, foam, air bubbles or pulp and there's no need to correct for temperature differences between refractometer and process vessel. Accurate readings can be taken by anyone...no skilled technicians required.

4 **Three Brix ranges available:** 0-25%; 12-72%; 36-82% total soluble solids. Withstands pressure of 40 lbs. and temperatures ranging up to 250°F.

*For further information write for Brochure SB10125*

AO SPENCER

American Optical Company

INSTRUMENT DIVISION, BUFFALO 15, NEW YORK

CIRCLE 121 ON READER SERVICE CARD

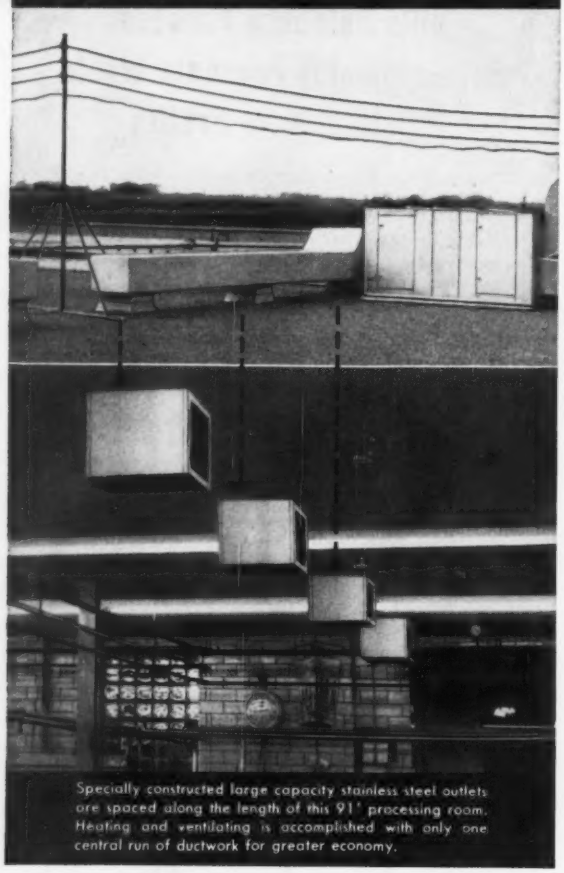
**KLIMATIC KING**

*heating and ventilating units solve humidity problem for*

**BONGARDS' CREAMERY**

Bongards' Creamery likes the way Klimatic King units have solved air problems in their cheese processing plant. High humidity has been licked, walls and ceiling are dry and working conditions are better. Klimatic King assures constant temperatures, continuous air circulation and pressurized control elimination of dust problems. Available in sizes 3,100 to 20,000 C.F.M. By adding a cooling coil Klimatic King units can be used for cooling.

One of two Klimatic King units installed on roof at Bongards' Creamery, Bongards, Minnesota. Insulated ductwork carries heated air to outlets in ceiling of cheese processing room below.



Specially constructed large capacity stainless steel outlets are spaced along the length of this 91' processing room. Heating and ventilating is accomplished with only one central run of ductwork for greater economy.

*50 years of experience is at your service. Write for free technical bulletin.*

KLIMATIC KING COMPANY OF OWATONNA

905 CEDAR ST., OWATONNA, MINN.


## Associated Industries

**Cherry-Burrell Corp.** has appointed Dennis T. Fitzmaurice as R &D v.-p.

**Dow Chemical Co.** has developed a new latex for pigmented paper and paperboard coatings. Named Latex 630, it's a special styrene/butadiene product.

**Flo-Tronics, Inc.,** new Minneapolis firm, will supply automated bulk handling systems to food industry.

**W. R. Grace & Co.** is building a 50,000 sq.ft. packaging machinery plant in Woburn, Mass.

**Hertz Corp.** now leases fork lifts and interchangeable container equipment.

**Knox Glass, Inc.,** will build a multi-million dollar container plant near Forest Park, Ga.

**Riegel Paper Corp.** reports it has acquired net assets of **Bartelt Engineering Co.,** Rockford, Ill., specialty packaging machinery manufacturer.

**Dr. Carl R. Fellers Dies**

Leading food technologist and educator Dr. Carl R. Fellers, 66, died last month while on a lecture tour in Canada.

Retired head of the Dept. of Food Technology at the University of Massachusetts, he was also a founder and past president of the Institute of Food Technology.

Dr. Fellers pioneered development of methods for pasteurizing dry foods and canning Atlantic crabs. He was cited by the Government for service as a bacteriologist in both world wars.

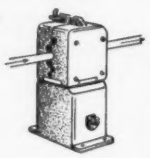
He was a member of IFT, American Public Health Assn., Soc. of American Bacteriologists, and American Fisheries Soc. of N. Y., and a Fellow of the American Assn. for the Advancement of Science.

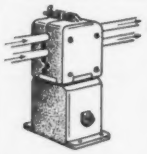

**PUMPING IDEAS**

**POSSIBLE ONLY with a SIGMAMOTOR PUMP**

**MOVE CORROSIVE LIQUIDS**

Material being pumped never comes in contact with pump mechanism. Wave-like motion of steel fingers forces material through Tygon tubing. By changing size of tubing, capacity can be increased or decreased. Pump housing opens for removal and insertion of tubing.



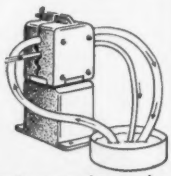


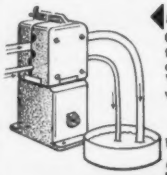
**PUMP 2 OR 3 DIFFERENT LIQUIDS SIMULTANEOUSLY**

Some models will accommodate up to four tubes so that four different liquids can be passed through the pump at one time without danger of contamination.

**FEED AND MIX**

One or more tubes can be feeding material to a mix while a larger tube is recirculating the liquid to produce agitation and thorough mixing. Viscous materials can be pumped without danger of gumming or plugging. Remove tube and pump is clean.





**METER ADDITIVES**

One or more additives can be pumped to a solution in the exact amount desired by selecting the correct size of tubing and regulating pump speed. Various controls can be incorporated to close valves ahead of pump.

**Capacities from 0.5 cc. per min. to 4.5 G.P.M.**

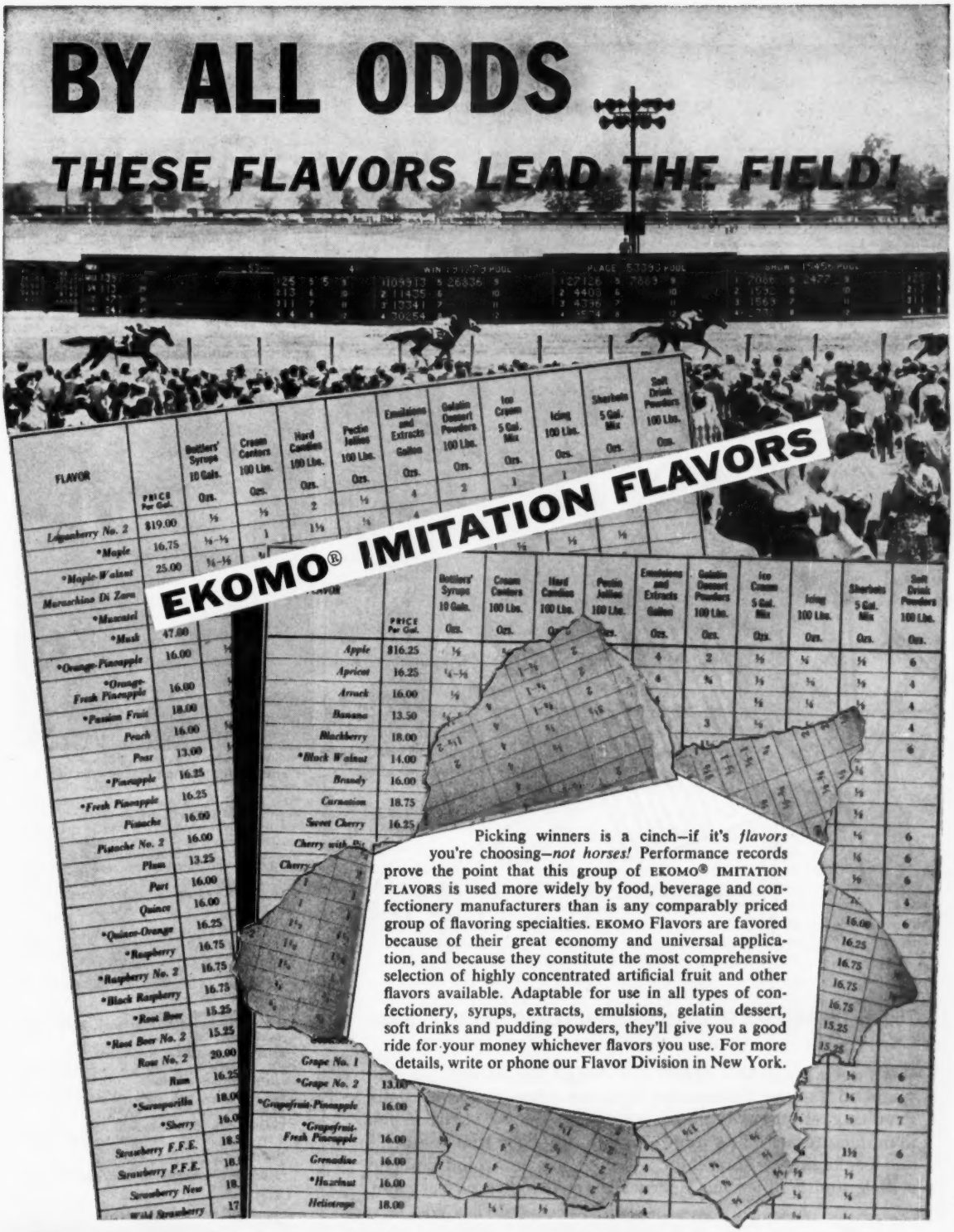
**Write for complete information on sizes and capacities.**

**SIGMAMOTOR, INC.**

22 N. Main Street • Middleport, N. Y.

# BY ALL ODDS

## THESE FLAVORS LEAD THE FIELD!


EKOMO® IMITATION FLAVORS
Picking winners is a cinch—if it's *flavors* you're choosing—*not horses!* Performance records prove the point that this group of EKOMO® IMITATION FLAVORS is used more widely by food, beverage and confectionery manufacturers than is any comparably priced group of flavoring specialties. EKOMO Flavors are favored because of their great economy and universal application, and because they constitute the most comprehensive selection of highly concentrated artificial fruit and other flavors available. Adaptable for use in all types of confectionery, syrups, extracts, emulsions, gelatin dessert, soft drinks and pudding powders, they'll give you a good ride for your money whichever flavors you use. For more details, write or phone our Flavor Division in New York.

| FLAVOR | PRICE Per Gal. | Bottlers' Syrups 10 Gals. Ozs. | Cream Centers 100 Lbs. Ozs. | Hard Candies 100 Lbs. Ozs. | Pectin Jellies 100 Lbs. Ozs. | Emulsions and Extracts Gallon Ozs. | Gelatin Dessert Powders 100 Lbs. Ozs. | Ice Cream 5 Gal. Mix Ozs. | Icings 100 Lbs. Ozs. | Sherbets 5 Gal. Mix Ozs. | Soft Drink Powders 100 Lbs. Ozs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Loganberry No. 2 | $19.00 | ½ | ½ | 2 | ½ | 4 | 2 | ½ | ¼ | ½ | 6 |
| *Maple | 16.75 | ½–⅝ | 1 | 1½ | ½ | 4 | ¾ | ½ | ½ | ½ | 4 |
| *Maple-Walnut | 25.00 | ¼–½ | ½ | | ½ | | | ½ | ¼ | ½ | 4 |
| Maraschino Di Zara | | | | | | | | | | | 4 |
| *Mustard | | | | | | | | | | | 6 |
| *Musk | 47.00 | | | | | | | | | | |
| *Orange-Pineapple | 16.00 | | | | | | | | | | |
| *Orange-Fresh Pineapple | 16.00 | | | | | | | | | | |
| *Passion Fruit | 18.00 | | | | | | | | | | |
| Peach | 16.00 | | | | | | | | | | |
| Pear | 13.00 | | | | | | | | | | |
| *Pineapple | 16.25 | | | | | | | | | | |
| *Fresh Pineapple | 16.25 | | | | | | | | | | |
| Pistache | 16.00 | | | | | | | | | | |
| Pistache No. 2 | 16.00 | | | | | | | | | | |
| Plum | 13.25 | | | | | | | | | | |
| Port | 16.00 | | | | | | | | | | |
| Quince | 16.00 | | | | | | | | | | |
| *Quince-Orange | 16.25 | | | | | | | | | | |
| *Raspberry | 16.75 | | | | | | | | | | |
| *Raspberry No. 2 | 16.75 | | | | | | | | | | |
| *Black Raspberry | 16.75 | | | | | | | | | | |
| *Root Beer | 15.25 | | | | | | | | | | |
| *Root Beer No. 2 | 15.25 | | | | | | | | | | |
| Rose No. 2 | 20.00 | | | | | | | | | | |
| Rum | 16.25 | | | | | | | | | | |
| *Sarsaparilla | 18.00 | | | | | | | | | | |
| *Sherry | 16.00 | | | | | | | | | | |
| Strawberry F.F.E. | 18.5 | | | | | | | | | | |
| Strawberry P.F.E. | 18.5 | | | | | | | | | | |
| Strawberry New | 18. | | | | | | | | | | |
| Wild Strawberry | 17 | | | | | | | | | | |
| Apple | $16.25 | ½ | | | | 4 | 2 | ½ | ¼ | ½ | 6 |
| Apricot | 16.25 | ¼–½ | | | | 4 | ¾ | ½ | ½ | ½ | 4 |
| Arrack | 16.00 | ½ | | | | | | ½ | ¼ | ½ | 4 |
| Banana | 13.50 | ¼–½ | | | | 3 | | ½ | | | 4 |
| Blackberry | 18.00 | | | | | | | | | | 6 |
| *Black Walnut | 14.00 | | | | | | | | | | |
| Brandy | 16.00 | | | | | | | | | | |
| Carnation | 18.75 | | | | | | | | | | |
| Sweet Cherry | 16.25 | | | | | | | | | | |
| Cherry with Pit | | | | | | | | | | | 6 |
| Cherry | | | | | | | | | | | 6 |
| | | | | | | | | | | | 6 |
| | | | | | | | | | | | 6 |
| | | | | | | | | | | 16.00 | 6 |
| | | | | | | | | | | 16.25 | |
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| | | | | | | | | | | 16.75 | |
| | | | | | | | | | | 16.75 | |
| | | | | | | | | | | 15.25 | |
| | | | | | | | | | | 15.25 | |
| Grape No. 1 | | | | | | | | | | ½ | 6 |
| *Grape No. 2 | 13.00 | | | | | | | | | ¼ | 6 |
| *Grapefruit-Pineapple | 16.00 | | | | | | | | | ½ | 7 |
| *Grapefruit-Fresh Pineapple | 16.00 | | | | | | | | | | |
| Grenadine | 16.00 | | | | | | | | | 1½ | 6 |
| *Hazelnut | 16.00 | | | | | | | | | ½ | |
| Heliotrope | 18.00 | | | | | | | | | ¼ | |


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Another in a series of Hoerner
Corrugated Shipping
Container Experts

**THIS IS THE HOERNER SPECIALIST FOR PACKAGING FOLDABLE THINGS**

If it's got a hinge this expert can design the corrugated container in a snap. Things that fold can often unfold enroute. Resulting shipping damage lays profits wide open. If you manufacture a folding item – or any other for that matter – and packaging or shipping costs have you in a bind, unbend a little and contact the Hoerner plant or office nearest you.

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*Corrugated Specialists for Mid-America*

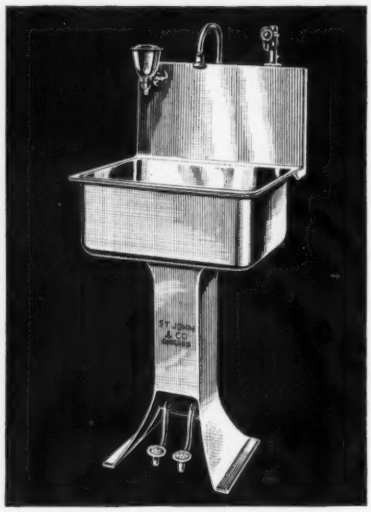
GENERAL OFFICES: 600 Morgan Street, Keokuk, Iowa • PLANTS: Fort Smith and Little Rock, Arkansas; Des Moines, Keokuk and Ottumwa, Iowa; Sand Springs, Oklahoma; Minneapolis, Minnesota; Tupelo, Mississippi; Springfield, Missouri; Fort Worth, Texas; Sioux Falls, South Dakota • ASSOCIATE: Cajas y Empaques Impermeables, S. A. Mexico City D. F., Mexico

124 CIRCLE 124 ON READER SERVICE CARD

# SANITARY!

## STAINLESS STEEL LAVATORY

by St. John



Designed for use wherever sanitation requirements are exceedingly high, this low-cost St. John lavatory is a remarkable achievement in every detail.

Originally intended for use in packing-houses where it meets and surpasses all requirements for federally-inspected plants, it has found wide application throughout the food industry because of its smart appearance, functional design and many practical features.

For example:

- **Extra Deep Bowl** – with smoothly rounded inside corners. Deep-drawn of type 302 stainless steel, seamless and handsomely polished.
- **Splashback** – drains into the bowl. Made of smooth, seamless stainless steel.
- **Unbreakable Soap Dispenser**—chrome plated, permanently fastened to splashback. Suitable for liquid or powdered soap.
- **Spray**—chrome plated, with aerating nozzle.
- **Foot Operated Valve**—hot and cold water separately controlled or mixed.
- **Pedestal**—heavy cast aluminum alloy, resistant to virtually all acids and alkalis.
- **Simple Installations**—attach to water lines and drain. Spray is piped from foot valve at factory.

***Write for full details and the complete St. John catalog.***

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# FE SERVICE CENTER


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Books ..... p. 145
Patents ..... p. 146
Classified ..... p. 150
Advertisers' Index ..... p. 154
Reader Service ..... Back of Book


## NEW EQUIPMENT & SUPPLIES

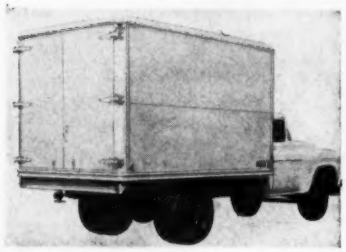
### Fluidless Plastic Coder

Newly offered automatic unit for marking and coding packages—the Teko Coder—requires no liquid ink, thus eliminates need for ink reservoirs, felts, and solvents.

In friction-type operation, it prints on porous packages, cartons, bags, and shipping containers through medium of pre-prepared inking cylinder made of Porelon (S. C. Johnson & Son, Inc.). This special plastic reportedly abolishes drip, gum-ups, and smudging.

Not depending on gravity feed, cylinder will operate in any position, printing copy up to 12 x 12 in. Each cylinder is designed to deliver up to 125,000 impressoins. And it takes but half a minute to fit a new one.—*Thomas Engineering Co., Chicago.*

**Circle 371 on Reader Service Card**



### Trim New Van Panel Body

Lighter weight and extra strength are improvements in new van panel truck body that's particularly suitable for a broad-range of food field transport.

Increased ruggedness and rust-resistance of roof structure are cited. Heavy gage one-piece header is weld assembled to roof radius and dieformed cross bows.

Bodies are offered in a selection of lengths, widths, heights, and customized features.—*MidWest Body & Mfg. Co., Paris, Ill.*

**Circle 372 on Reader Service Card**

### Electronic Tip-Tray System Speeds Orders

Monitored by IBM 650 Ramac digital computer and an analog unit, this new warehouse order sorting system employs unique tipping-tray conveyors for fast handling of packages.

Its high performance is evidenced in a Midwest mail-order house (photo), where four lines sort orders at 240 packages/min., for a reported saving of 90% on labor costs.

First, groups of 400 orders are converted to punch cards. These are fed to electronic reader. Then computer (1) decides if order can be filled, (2) prints out charge, (3) indicates where item is located, and (4) turns out a coded "picking ticket" for each specific item of merchandise. The 400 orders are then divided into four groups for 100-at-a-time filling runs.

Automatically shuffled into numerical stock sequence, tickets go to order pickers, men who "pull" goods from stock. As picker selects each item, he attaches coded ticket with transparent tape and drops article on belt carrying goods to electronic sorting area.

Sorter lines are endless chain conveyors topped with a continuous series of fiberglass tilt-pans (1 x 2 ft.). Set side by side are two 350-ft. loops of these conveyors. They run at up to 500 fpm. And on either side of these pan conveyors are belts carrying 100 tote tubs (3 x 3 ft.) to take the 100 orders.

As items from stock reach loops, they are placed manually on tilt-pans so tickets can be read by girl operator when items enter line. She punches order code numbers into analog computer's "memory" at rate of 60/min. Then at key points in loop travel, pans are triggered to tip items into proper tote tubs.

One tub is assigned for each order and all items on an order end up in that tub. When 100 orders are filled, tubs move to packing area, where handlers prepare each order for shipment.

Running at full capacity, system can process 100,000 items in an 8-hr. day. Equipment may also be used in receiving routines.—*Speaker Sortation Systems, Inc., 316 E. Silver Spring Dr., Milwaukee.*

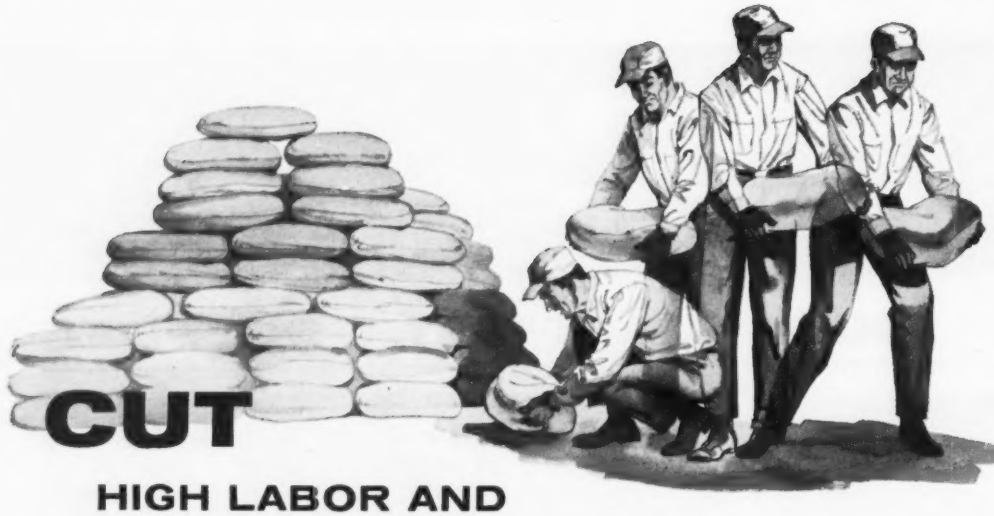
**Circle 373 on Reader Service Card**

### New Indicating Transmitter

Designed for pressure, flow, temperature, liquid level, and dew-point applications, latest pneumatic indicating transmitter of universal type



***Want more information on any items? Just circle the key numbers on Reader Service Card, back of book***



# CUT

## HIGH LABOR AND CONTAINER COSTS

*...with a*

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*Air Conveying System*

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FROM $3.60 TO $6.10
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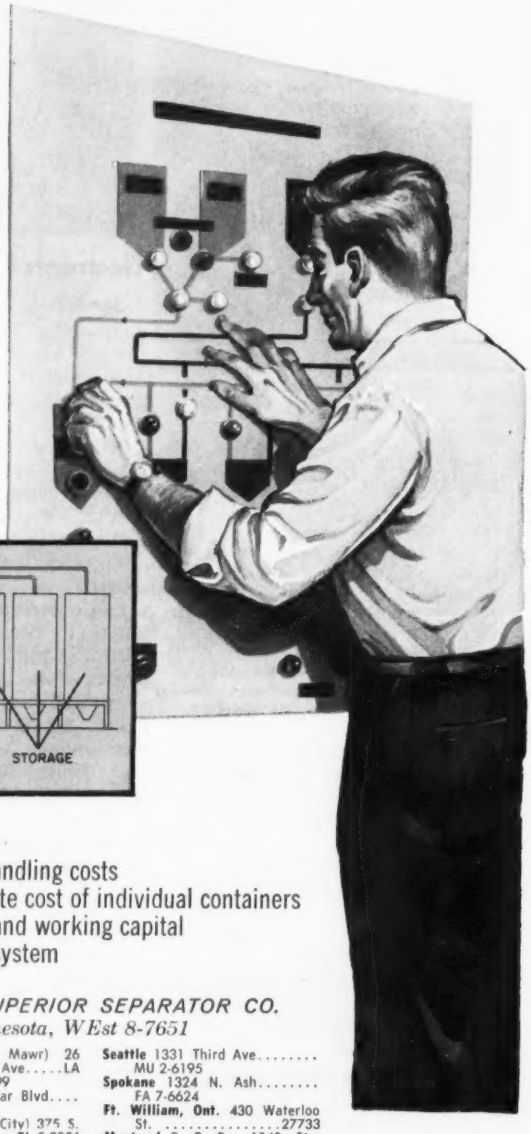

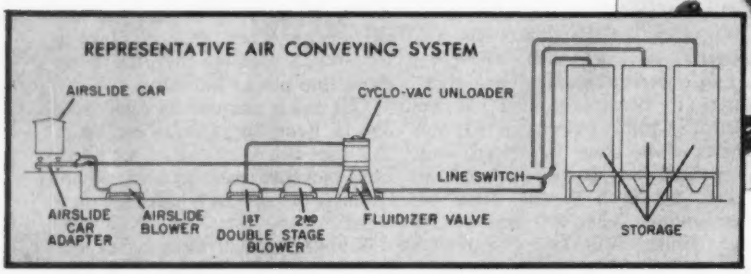


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**BENEFITS:**

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- Completely sanitary system

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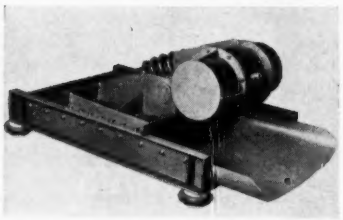
(Model 45 Series) incorporates special measuring elements for each major process variable.

Operation is on 20-psi. air supply, and output signal runs 3-15 psi. (3-27 psi. optional). Maker reports high ambient temperature stability (less than ½% error for changes as great as 50F.). And overall calibrated accuracy of ±½% is guaranteed.

Large scale (6⅛-in.) and fluorescent pointer give quick readings. Universal bracket simplifies mounting.—*The Foxboro Co., Foxboro, Mass.* **Circle 374 on Reader Service Card**



## Efficient Vibrating Feeder

New motorized-counterweight vibrating feeder (photo) is offered in expanded line of units running to capacities of 1,700 tons/hr.

This machine is available for either cable suspension or floor mounting to feed a wide range of bulk materials at uniform rate from bins, hoppers, or other containers.

Maker says it evens out surge loads and results in a cleaner installation with considerably less maintenance. Machine shown is single-motor model. Twin-motor versions are included in line.—*Link-Belt Co., Prudential Plaza, Chicago 1.*

**Circle 375 on Reader Service Card**

## Color-Plastic Jug Handles

These handy plastic handles for jugs, called Carry-Rites, are available in a range of sizes to fit different-make containers. For maximum consumer appeal, brilliant colors are offered.—*The Haynes Mfg. Co., 4180 Lorain Ave., Cleveland 13.*

**Circle 376 on Reader Service Card**

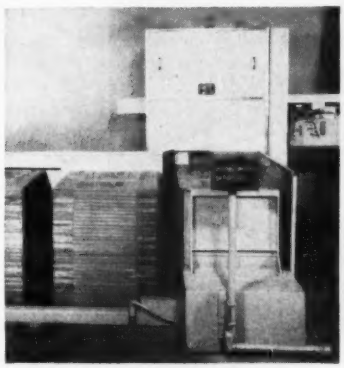
## Two Versatile Servo Units

For use in computing systems, control hookups, indicating-gage applications, etc., two new Dynamaster. Servomechanism units come mounted in hinged swinging panels to fit standard 19-in. relay racks.

The first, Model 692, has 22-in.-long drum-type scale offering superior visibility. Balancing shaft provides for fitting retransmitting slidewire or alarm contacts. Unit can be mounted to accommodate encoders.

Second, Model 694, has 11-in. scaling showing entire range. Retransmitting slidewires, analog-to-digital encoders, and alarm contacts can be mounted.—*The Bristol Co., Waterbury 20, Conn.*

**Circle 377 on Reader Service Card**



## High-Output Case Former

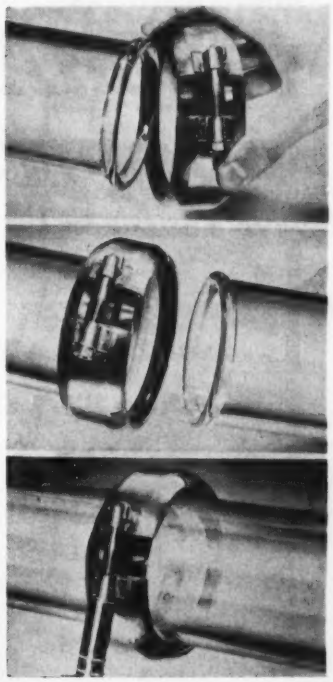
This new, speedy case former and positioner is fully automatic and adaptable to all standard casepackers with minimum modification.

New "top of stack" feed eliminates backlog pressure and damage to casepacker. Over 20 cases/min. may be formed, and reliability checks show new production-time maximums.

Number and height of flat stacks is limited only by floor space and height of casepacker horn. Low-level feed conveyor is an automatic, motor-driven, live-roll conveyor only 6 in. off floor. Low level allows rapid hand or forklift loading, and a 500-case magazine can be handloaded in less than 5 min.

Adjustable to many size cases, former is available for several floor plans, and semi-automatic portable units may be supplied for special operations.—*Caral Packaging Machinery, Inc., 771 University Ave. at 5th St., Berkeley, Calif.*

**Circle 378 on Reader Service Card**



## Jiffy-Coupled Pyrex Lines

Efficient one-piece couplings designed to make quick, permanent compression joints feature the new rugged Pyrex drainline system.

Sequence photos illustrate speedy fitting. Joint is made merely by stabbing both ends of glass piping into coupling and turning a single nut. Coupling comprises a stainless steel shell, plus a rubber sleeve and a liner of Teflon.

Piping and fittings are of hard, low-expansion borosilicate glass that is resistant to virtually all corrosives. A total of 30 different glass fittings are available for system.

Working pressures to 15 psig. and temperatures to 250F. are handled by lines. Standard piping is of 5 and 10-ft. lengths, with diameters ranging from 1½ to 6 in.—*Corning Glass Works, Corning, N. Y.*

**Circle 379 on Reader Service Card**

## Double-Duty Limit Switch

Savings in wiring, space, and time, while simplifying actuating systems, are gained with use of new plug-in limit switch, says maker.

Unit, designated 301LS1, can do double duty—for it contains two 2-circuit double-break switches which can control four isolated circuits.

Roller level, when moved to left,

# MECHANIZE... PROFIT-WISE!

## ...with a LAMSON AUTOMATIC PALLET LOADER

Palletizes cartons, cases, rigid bags quickly, economically

Referred to as the "perfect link between packaging and warehousing," the LAMSON AUTOMATIC PALLET LOADER is acclaimed as a huge, money saver by leading producers of package products.

Man hours per pallet load are cut. Considerable saving occurs in the reduction of damage or breakage to cartons. Valuable men are freed for other important duties.

These reductions have been more than enough to amortize the entire cost of the LAMSON AUTOMATIC PALLET LOADER.

The introduction of the Automatic Pallet Loader was another LAMSON first in the materials handling field. A result of the ceaseless engineering vitality of LAMSON men firmly based upon 75 years of experience.

Why not bring your materials handling problems to the leaders in the field? Write LAMSON today for the name of your nearest Field Engineer. Or, simply clip this advertisement to your letterhead and mail to:

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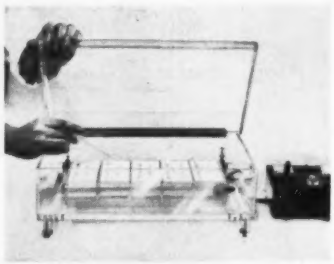
actuates one of basic switches; when moved to right, it operates other.

Components are in diecast aluminum housings. Assembly (using mounting block 18PA3) is oiltight after proper hooking to sealed conduit.—*Micro Switch, Div. of Minneapolis-Honeywell Reg. Co., Freeport, Ill.* Circle 380 on Reader Service Card



### Multi-Sampling Unit

New paper electrophoresis apparatus precisely identifies fractions of microgram to millogram quantities of acids, bases, carbohydrates, proteins, and other compounds—usually within 1 hr.

Special organic buffers of the multiple-celled unit minimize evaporation and allow higher voltage. Unit is designed to run 1-5 samples simultaneously at pH values 3.3-9.3.

Rapid separation of known samples for quantitative analysis is also possible with system using specially-developed reference dyes — *Microchemical Specialties Co., 1825 Eastshore Highway, Berkeley 10, Calif.*

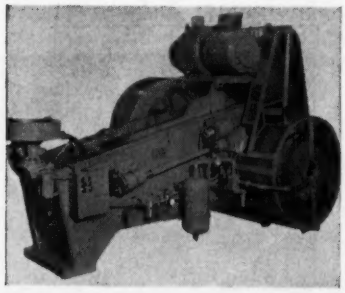
Circle 381 on Reader Service Card

### Wheel Spurs Unscrambling

Floating wheel-type attachment (photo) for rotary unscramblers now speeds performance on straight-sided odd-shaped containers run on Styl-O-Matic type tables.

Wheel turns opposite to the disk rotation to "kick back" one side and thus accelerate discharge to take away conveyor.—*Island Equipment Corp., P.O. Box 38-276, Miami 38, Fla.*

Circle 382 on Reader Service Card



## Ups Aluminum Can Output

Speeds of up to 120 aluminum beer cans/min. (11½-oz.) are possible with this new impact extrusion press.

Teamed with a previously-developed continuous strip casting operation, press is cited by maker as bringing the sanitary aluminum can to a competitive level with conventional cans.

Design is accented by switch from knuckle-joint action to eccentric action, allowing higher impact speed and more time for feed and ejection operations.

Press is a straight side, single action, 400-ton machine equipped with a variable speed motor. Hopper feed directly connects to drive to assure accurate timing.

Can bodies measure 5½x2½ in. Wall thickness is 0.010-in. and that of reinforced bottom 0.025-in.—*E. W. Bliss Co., 65 Adams St., Brooklyn, N. Y.*

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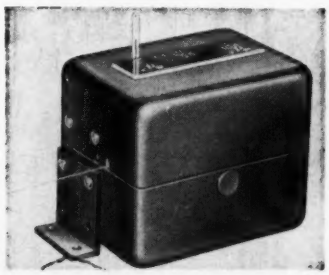
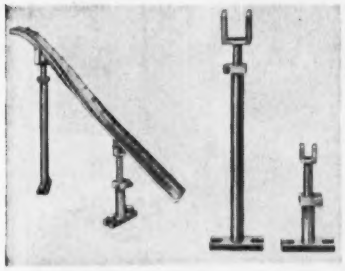


## Efficient Mechanical Servo

Precise control and recording actions are motivated by this new Model 301-L mechanical servo. Without requiring a transducer, it amplifies minute forces under direct actuation by mechanical flow, pressure or temperature measuring elements.

Less than 1 gr. (0.04 oz.) of force is needed for accurately positioning amplifier. And the output, which may be as much as 500 gr. (18 oz.) can be used to position automatic controls, recording pens, encoders, or small valves, also to actuate switches or position pilots to control hydraulic servo systems.—*American Meter Co., Inc., 13500 Philmont Ave., Philadelphia 16.*

Circle 384 on Reader Service Card



## Prefab Chute Supports

New setup simplicity is afforded by these prefab columns and yokes for support of gravity feed chutes.

There is ready adjustment of units for height. And yokes, which can be rotated full 360 deg., are easily shaped or cut, where necessary, for fitting to lines. Various sizes are offered.—*Syntron Co., 460 Lexington Ave., Homer City, Pa.*

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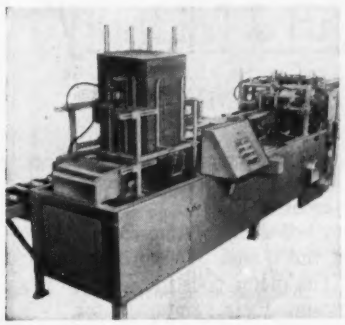

## Top-Integrated Casing Line

Almost any rigid or semi-rigid container can be automatically opened, erected, loaded, and sealed on this new Model 41 casing machine. Speeds run to 25/min.

Feeding is from a vertical stack of up to 200 flat cases with positive vac cups to strip-off bottom case. Packages are accurately positioned, smoothly accumulated by rows, elevated to complete any tier pattern, and end or side-loaded.

Controlled from a pushbutton panel, enclosed pressurized system provides uniform glue application, and cuts maintenance and clean-up time.—*FMC Packaging Machinery Div., Stokes & Smith Plant, 4992 Summerdale Ave., Philadelphia 24.*

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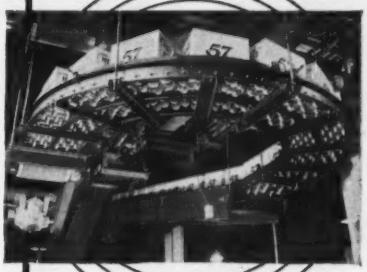
**MECHANIZE... PROFIT-WISE!**

**WITH LAMSON ENGINEERED CONVEYOR SYSTEMS**



Engineers Break A Bottleneck

*It's True.*

Mechanization will increase the capacity of your present buildings and the production of your present equipment. Increased profits will amortize the expense.

*But,* you need the touch of experienced materials handling engineers to guarantee this result. That is where LAMSON leads all the rest.

During the past 75 years, LAMSON engineers have created more custom engineered conveyor systems that have cut costs, raised production and profits than any other firm. For complete, professional service from problem analysis through installation and beyond, you can depend on LAMSON.

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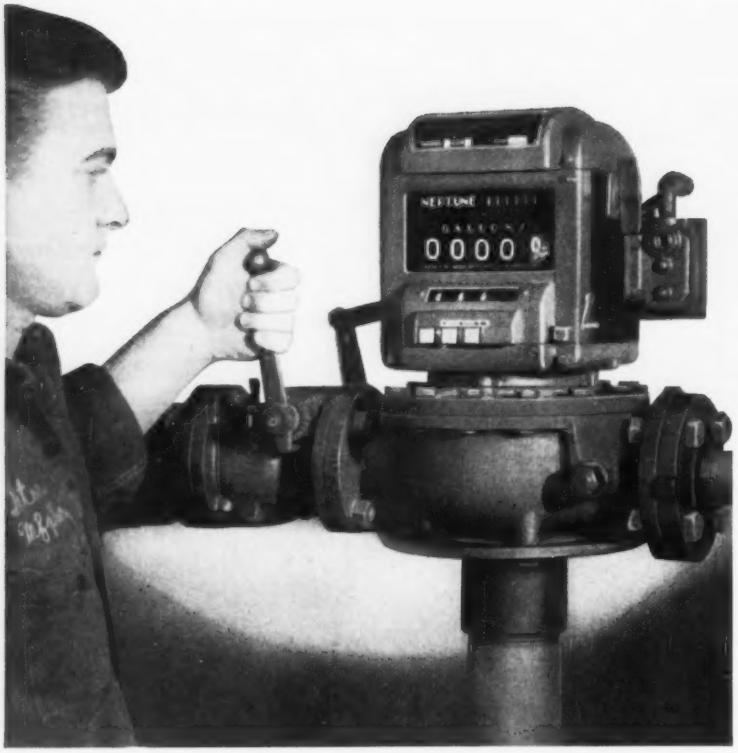


# Neptune "Meter with a Memory" never forgets the formula

Why waste a good man's time counting buckets, remembering formulas, waiting for liquids to creep up to gauge marks, repeatedly running the risk of counting or reading errors?

Let the precise "mechanical memory" of this Neptune repeating Auto-Stop meter do the work. Set the quantity required by the formula just once. Open the valve. The meter does the rest... shuts off automatically at the exact amount. Even prints a batch ticket if you want. The meter "remembers"...delivers the same amount each time the valve is opened until reset for a different quantity.

A meter helps a good operator produce more, with consistently better quality, less back-breaking work, and better housekeeping. Investigate this cost-saving meter today. Our field engineers will be glad to help.

**GET THE FACTS**
*Ask for helpful Meter Data Bulletin 566 YF See Neptune Data Pages in Chemical Engineering Catalog.*

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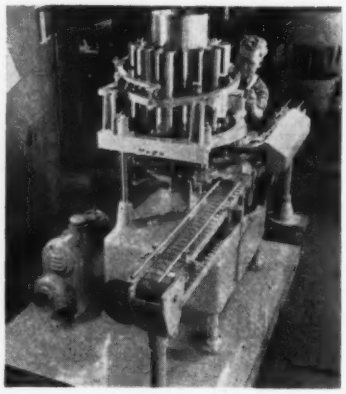

## High-Speed Rotary Filler

Up to 300 containers/min. may be filled with this new 10-station rotary piston unit.

Semi-viscous to semi-solid products, ranging in consistency from evaporated milk to potted meats, are handled. And maximum accuracy is provided by a rigid cam-track height-of-fill control.

A continuous 4-ft. infeed and 4-ft. discharge through-feed conveyor is used for glass, paper, or pre-pack packages. Standard metal can chutes are supplied in 4, 6, and 8-ft. lengths.

Cylinders are offered in three standard sizes: 1¾-in. dia. for 1-8 oz.; 2¾-in. for 4-16 oz.; and 3¾-in. for 8-38 oz.—*The Pfaudler Co., 1107 West Ave., Rochester, N. Y.*

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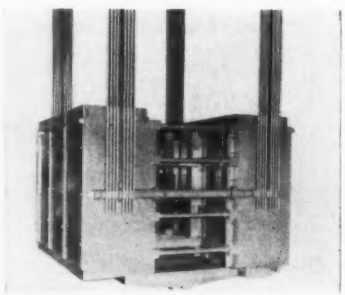

## For Stepped-Up Sifting

Redesigned ceiling-suspended sifting unit (photo) accents new high capacity and accuracy in dry-material runs. Up to eight distinct separations per stack are possible, says maker.

Of the "Super-Sifter" line, new machine employs square-section horizontal cross members in structural frame, with number of members increased for stepped-up performance.

Action is gyratory, giving sanitary, dustless operation.—*Sprout-Waldron & Co., Inc., 130 Logan St., Muncy, Pa.*

Circle 388 on Reader Service Card

## Speeds Freight Loading

New 1-man dunnage system for loading RR cars is termed faster, safer, more economical.

System, called the SEL, employs series of load-locking crossmembers. These have end-fittings that slip into slots in steel side rails mounted flush with inside walls of car.

The side rails are adjustable to any level that may be required. When not needed, they're readily removed. —*Sparton Railway Equipment, Div. Sparton Corp., Detroit 12.*

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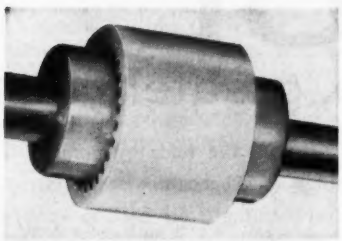


## Lube-Less Nylon Coupling

Product contamination from oil is abolished with use of new all-nylon gear coupling which needs no lubrication.

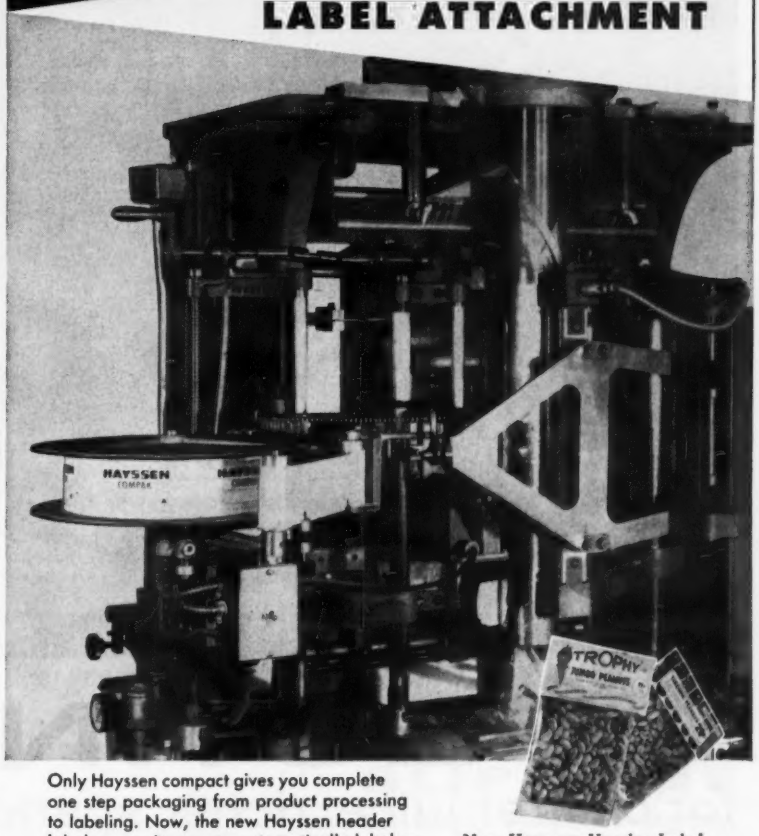
Designated Series J, units are for direct drives with small integral hp. and fractional hp. motors. Both hubs and sleeves are made of special high-strength stress-relieved nylon.

Hubs are bored for four shaft sizes ranging $\frac{3}{8}$ in. to $\frac{3}{4}$ in., and they are set-screw-locked on shaft. Coupling's overall length is $2\frac{3}{32}$ in. and sleeve o.d. is $1\frac{1}{16}$ in.—*Waldron-Hartig Div., Midland-Ross Corp., P.O. Box 791, New Brunswick, N. J.*

Circle 390 on Reader Service Card

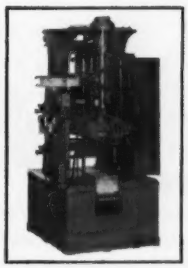

ELIMINATE YOUR SEPARATE LABELING OPERATION

USE NEW HEADER LABEL ATTACHMENT




Only Hayssen compact gives you complete one step packaging from product processing to labeling. Now, the new Hayssen header labeler permits you to automatically label as you package, trimming your packaging labor requirements by at least two, helping you maintain high speed production and eliminating side trips to semi-automatic equipment.

*New Hayssen Header Label Attachments are now in use at Kroger Co., Dayton Nut, King Nut and Kar Nut packaging plants.*



**Only Hayssen Compak measures, forms, fills, seals and labels in one operation!**

- End sidetrips to semi-automatic header labelers, save cost of equipment, cut packaging labor requirements.
- Increase production speed — the Hayssen Compak Header label attachment is coordinated to the speed of the Compak to which it is attached. You label at the same high speed at which you package.
- Use roll stock — change labels quickly and easily for new packaging flexibility — attachment completely adjustable to label size. Labels can't curl, double feed.

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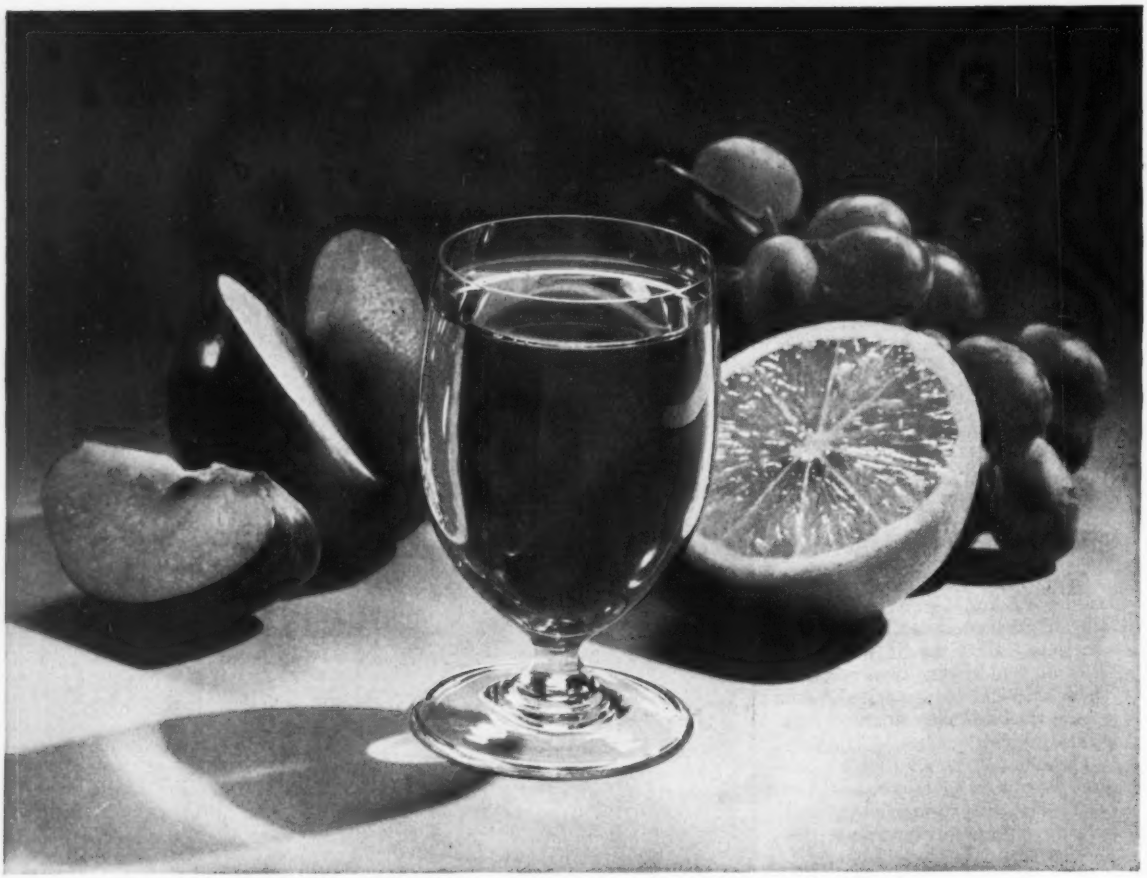

# PECTINOL®

## for clearer juice, richer sparkle, greater yield

Wouldn't you like to see your fruit juices take on a clear, glowing sparkle and have better sales appeal? You can do it with the help of PECTINOL natural enzymes. Many untreated fruit juices have a characteristic cloudy appearance that persists even after repeated filtering—a phenomenon usually caused by millions of tiny, suspended pulp particles that do not settle because of the protective colloidal action of pectin. PECTINOL enzymes hydrolyze such pectins, the protective-colloid action is destroyed, and the suspended particles settle and make filtration easy.

PECTINOL action on fruit pectins can be helpful in many ways. When mixed directly with crushed grapes or berries, PECTINOL promotes the breakdown of the fruit structure, facilitates pressing, increases the yield of juice, improves color extraction, and speeds filtration. In preparing juice concentrates, PECTINOL prevents premature gelation during evaporation—when the fruit pectins are hydrolyzed with PECTINOL, the juice evaporates uniformly without tending to gel as the water content is lowered. Burning on heating coils is also reduced.

PECTINOL enzymes have been used in preparing juices, extracts, concentrates, purees, jellies, and marmalades from apples, grapes, oranges, prunes, dates, apricots, pears, strawberries, cranberries, blackberries, cherries, grapefruit, lemons, limes, and many other fruits.

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### Automatic Fish-Stick Slicer

With this machine, says maker, up to 100,000 fish sticks can be cut hourly. Photo shows automatic unit making circular cuts of deep-frozen product.

Precise cuts and weights are cited, with minimizing of fish sawdust Circular cutters are of long-life type. Ready adjustment for various-size cuts is reported, and design accents easy cleaning.

Included is spreader and divider for sticks feeding to breading machine.—*Rimbach Mfg. Co., Inc., 1659 W. 135th St., Gardena, Calif*

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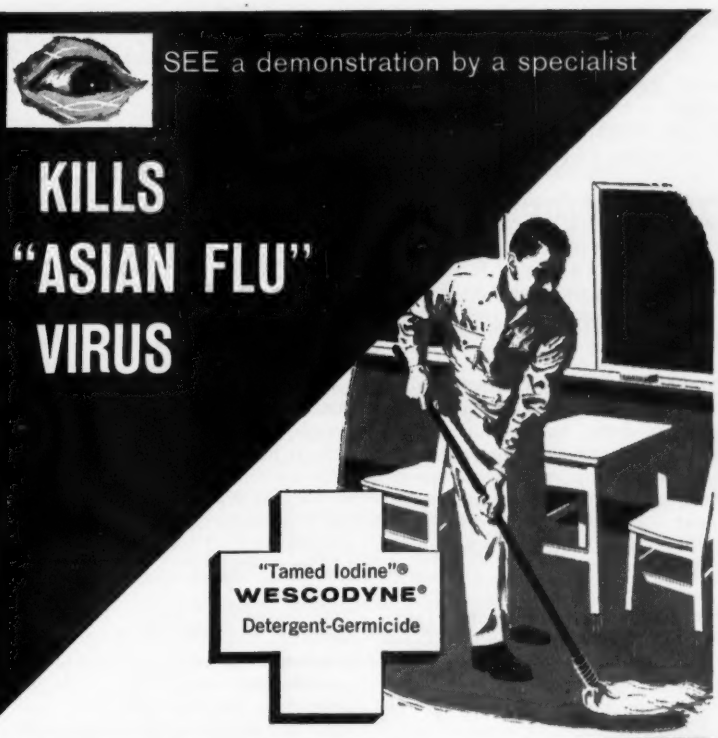
## INGREDIENTS

**All-Vegetable Divider Oil** is new ingredient-lubricant for baking field. It's described as clear, full-bodied, virtually tasteless, and non-oxidizing, with no mineral oil included. Maker says this product is suitable for use in all dividers and won't gum up. Shipments are in 415-lb. net non-returnable bunghole steel drums.—*Mallet & Co., Inc., P.O. Box 474, Carnegie, Pa.* (392)

## NEW SUPPLIES

**New Brush-On Aluminum Roof Coating** is asphalt-based product available in both fibrated and unfibrated form. Maker states it covers excellently in roof renovating jobs, giving highly reflective surface that balks penetration of sun's heat in Summer, while acting as insulator in Winter.—*Barrett Div., Allied Chem. Corp., 40 Rector St., N.Y.C. 6.* (393)

**Aisle Markings** scribed with Adheron reportedly give better than 3-yr. service. Modified epoxy is basic in for-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mula. Signal yellow and international orange are colors offered.—*Hauger-Beegle Assoc., Inc.*, 900 W. 49th Pl., Chicago 9. (394)

**New Surface & Equipment Cleaner,** called "Forward" combines exceptional alkaline detergency with silicate-buffering for safety. Product includes anti-bacteria sanitizing agent. —*S. C. Johnson & Son, Inc., Racine, Wis.* (395)

**Non-Slip Surfacing Product** is now offered in a luminous yellow that glows in dark. An addition to X-L Veneer line, it's recommended for use on dark steps, ramps, and special tread areas on and around equipment. — *The Monroe Co., Inc.*, 10703 Quebec Ave., Cleveland 6. (396)

**Flexible Metal Hose** in new Interlox BD-15 line is recommended for conveying hot or cold liquids under pressure. Offered are nine i.d. sizes (¼-to-3 in. range) and a choice of coatings, including galvanized steel, stainless steel, and phosphorbronze. Packed with asbestos yarn, hose is suitable for steam lines, pressure sprayers, and like applications.—*The International Metal Hose Co., Ashford Ave., Bellevue, Ohio.* (397)

## BRIEFS

**Improved Conveyor Bearings** now solve corrosion problems, also reduce running noise and save weight. Made of Delrin (acetal resin developed by DuPont), they are plus-feature in line of materials handling units.—*The Rapids-Standard Co., Inc.*, 342 Rapistan Bldg., Grand Rapids, Mich. (398)

**Material-Level Indicators** in two new models give advanced performance in both bin checking and activation of feed-unit controls. Units are the SG-4X and SG-4, former for hazardous dust locations, latter for general purpose uses.—*Fuller Co., Catasauqua, Pa.* (399)

**New Miniature 'Robot Eyes'** for counting and controlling are high performance photoelectric units with transistorized amplifiers. Plug-in connection and easy mounting give added convenience. Operating speeds run to 1,000/min.—*Standard Electric Corp., 657 B'Way, New York City 12.* (400)

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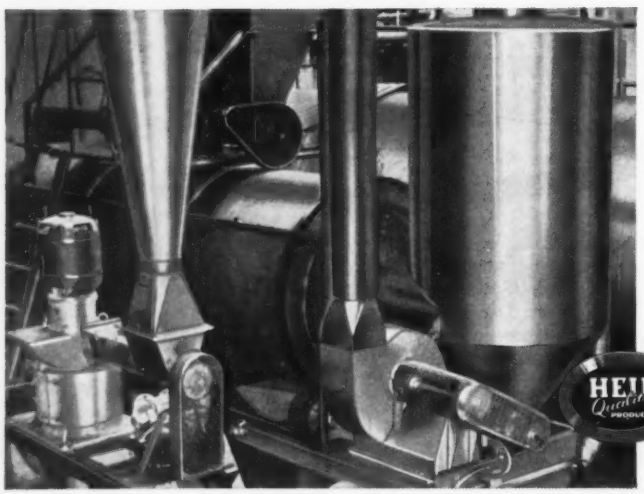
# HEIL DRYERS

***convert waste disposal problem into profit-making by-product***




San Jose Canning Co., San Jose, Calif., uses a Heil dryer to reduce moisture content of tomato pomace from 50 to 7 percent. With additional processing it is sacked and sold to animal feed packers. Production is around 6½ tons in a 20-hour shift. Result: hauling costs are down two-thirds and San Jose earns an income from material that once cost money just to be thrown away.

A Heil dryer dries materials on a stream of hot air, with each particle correctly exposed in proportion to its moisture content. Result is quick, uniform drying. The Heil unit is compact, too, with three drying cylinders within a single drum. Write for all the facts on Heil dryers . . . capacities range from models to evaporate 500 lb up to 36,000 lb of water per hour.

**THE HEIL CO.**
*Manufacturers of the Arnold Dryer*
Milwaukee, Wisconsin

Photo courtesy of Canner/Packer Magazine

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***NOT administrative detail...NOT "crash" programs...NOT service duties...NOT trouble shooting ...But stimulating, unhurried, rewarding, fundamental research in the broad fields of:***

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*We are seeking:*

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3. ORGANIC POLYMER PROPERTIES AND SYNTHESIS
4. CHEMISTRY AND PHYSICS OF SURFACES
5. ENGINEERING THEORY AND ENGINEERING PHYSICS
6. FOREST PRODUCT AND CELLULOSE MATERIALS

*We also need:*

**OTHER PERSONNEL,** ranging from senior research personnel with Ph.D's to research assistants with BS degrees. We are seeking people who are competent, creative, dedicated, and who desire freedom to pursue ideas. Situations open include:

**PHYSICISTS AND PHYSICAL CHEMISTS**

**1.** High temperature research up to 20,000 K. Gas stabilized arcs, thermodynamics, spectroscopy, calorimetry and related areas. Theoretical and experimental.

**2.** Solid state. Electronic properties of amorphous material. Thermo-electricity, conduction in ionic and non-polar materials, luminescence, dielectrics, band theory, quantum mechanical theory. Theoretical and experimental.

**3.** Solid state. Structure and behavior of crystalline and amorphous materials. Magnetics, radiation damage, structure determination. Experimental.

**4.** Solid state. Experimentalist to set up and supervise laboratory for measurement of properties and preparation of materials, (principally non-metals.)

**5.** General. Firm foundation in engineering physics: heat, mechanics, sound and optics. Good experimentalists with strong analytical background.

**6.** Theoretician in engineering physics or applied mathematician to work in hydrodynamics and other areas.

**PHYSICAL CHEMISTS AND CHEMISTS**

**1.** Familiarity with high temperature techniques and strong in thermodynamics. Problems in reaction rates and mechanisms, absorption and diffusion.

**2.** Properties and synthesis of organic and inorganic polymers; structural chemistry of inorganic polymer materials.

**3.** Preparation and synthesis of materials, ceramics, salts, polymers, etc. Clever laboratory man.

**INSTRUMENT AND MEASUREMENT SPECIALISTS**

Capable of setting up laboratories and developing techniques. *No routine service activity,* but collaboration in research. We need skilled men in:

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**2.** Crystallography, optical and x-ray.

**3.** Spectroscopy, U.V. and I.R.

**4.** Magnetic resonance methods, EPR, NMR and NQR.

**5.** Electrical property measurements (micro-wave).

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**ENGINEERS**

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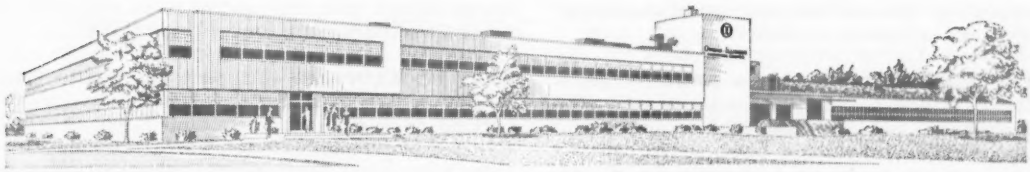
**OPENINGS IN APPLIED RESEARCH.** We also have a number of openings in applied research in the areas of physical chemistry, engineering physics and organic chemistry.



**THOSE WHO JOIN US** will work at the Owens-Illinois Technical Center in Toledo. Toledo is a community of 350,000 with many delightful residential sections, fine schools and a well-rated university. Cultural facilities include a renowned art museum and zoo. The community has excellent recreational facilities. You can drive via turnpike to Chicago or Pittsburgh in 4-½ hours, and to Ann Arbor (University of Michigan) or Detroit by expressway in one hour.

**WHO WE ARE.** Owens-Illinois manufactures Duraglas containers, Libbey table glassware, Kimble scientific and electronic glassware, and construction glass products. We are one of the leading manufacturers of corrugated paperboard and boxes, closures and plastic containers. We have 57 plants and mills, and more than 32,000 employees.

**For interview, contact: Harold F. Zink,** Dept. FE
**Owens-Illinois Technical Center, Toledo 1, Ohio**

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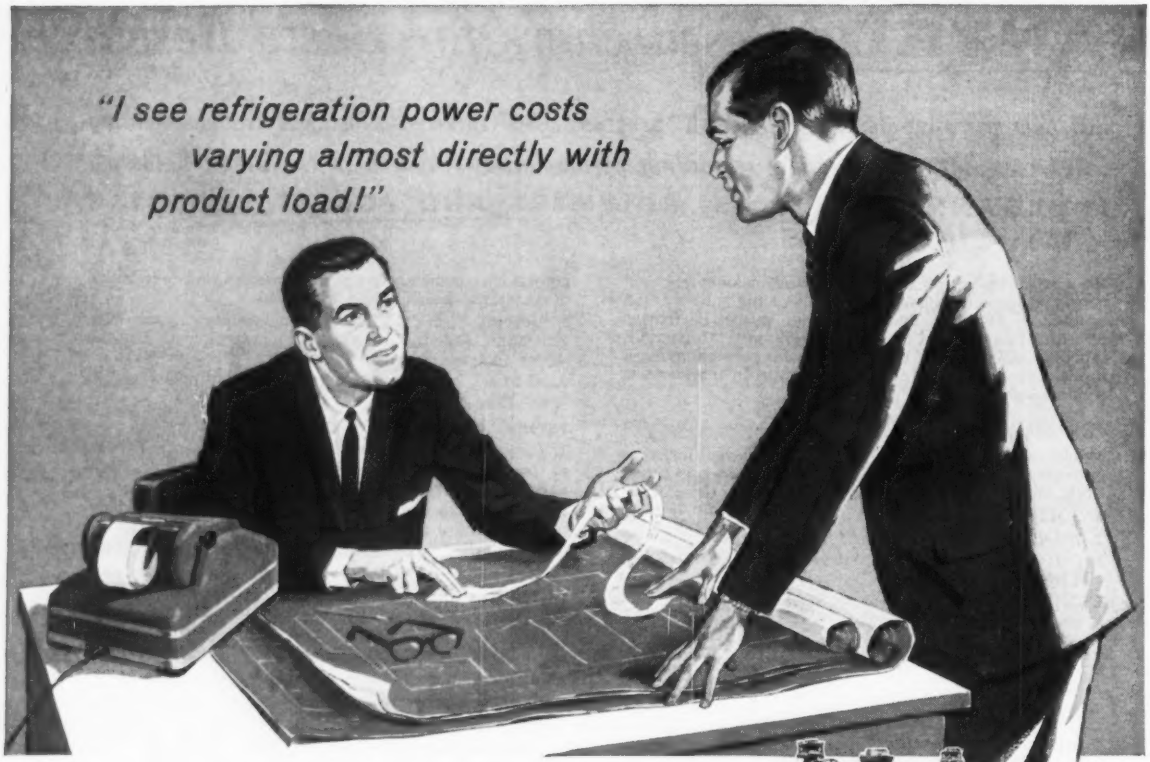


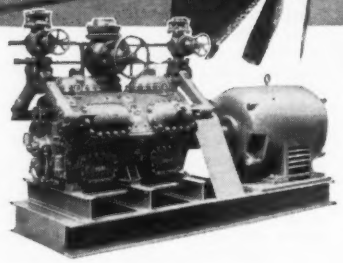

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*—Gives you almost straight-line savings*

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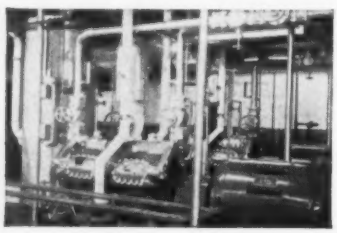
**LOCATE ANYWHERE CONVENIENT**—V/W Compressors are statically and dynamically balanced to assure smooth, quiet, vibration-free operation. Unit needs no expensive foundation—can be located anywhere, remote from main engine room and even on upper floors, eliminating long refrigerant lines.

**EASY TO MAINTAIN**—All parts subject to wear quickly replaceable with simple hand tools...profit-cutting down-time virtually eliminated. A York Certified Maintenance Contract further assures continuous operation. Ammonia and halocarbon refrigerant units available up to 200 tons capacity.



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***Detroit Refrigerating Div., Beatrice Foods Co.***—The 40-year old horizontal compressors in this 1,980,000 cu. ft. cold storage warehouse were replaced with York V/W units to provide more efficient, automatic operation. The new system maintains constant temperatures with little or no attention.

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**Butterfly Valves.** Data on rubber-seated models for use to 125 psi. 36p.—Darling Valve & Mfg. Co., Williamsport, Pa. (418)

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**Motors.** Describes multi-shielded, drip-proof models. 4p.—Sterling Electric Motors, Los Angeles. (420)

**Gate Valves.** Covers chemical-resistant units with nylon disk seats. 2p.—OPW-Jordan Corp., Cincinnati. (421)

**Insulating Material.** Describes features of expanded polystyrene. 8p.—United Cork Co., Kearny, N. J. (422)

**Radio Equipment.** Details 8½x12 two-way model for cars and trucks.—General Electric, Lynchburg, Va. (423)

**Aluminum Tubes.** Selection information on proper alloy, temper designations and chemical resistance. 48p.—Revere Copper & Brass, Inc., NYC. (424)

**Swing Joints.** Specs and service instructions on bronze, steel, Monel, and aluminum models. 12p.—Jordan Corp., Cincinnati. (425)

**Glasteel Pipe.** Features of boro-silicate glass and steel material. 8p.—Pfaudler Permutit, Rochester. (426)

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**Scrubbers & Cyclones.** Details functions of units for low-cost pollutant control. 12p.—Schutte & Koerting Co., Cornwells H'ts., Pa. (428)

**Condensers.** Analyzes specs and applications of air-cooled devices. 12p.—Halstead & Mitchell, Pittsburgh. (429)

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**Generators.** Gasoline engine-driven units for primary, standby, and portable power. 4p.—D. W. Onan & Sons, Minneapolis. (432)

**Timing Belt Drives.** Covers design, installation, and maintenance.—R. & J. Dick Co., Totowa, N. J. (433)

## PROCESSING

**Sugar Clarifier.** Gives specs and operating instructions of high capacity unit. 10p.—Graver Water Conditioning Co., N.Y.C. (434)

**Mixers.** Describes operation, sizes and capacities of firm's line of processing equipment. 4p.—Skinner Engine Co., Erie, Pa. (435)

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**$CO_2$ Blast Chilling.** Covers operation and benefits of process for shipping perishables. 4p.—Pure Carbonic Co., N.Y.C. (438)

**Filteraids.** Describes diatomite and perlite fillers and aids. 2p.—Great Lakes Carbon Corp., Los Angeles. (439)

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**Adaptioneering Dictionary.** Alphabetically describes size reduction, classification, materials handling, mixing, blending, pelleting, and densifying activity for variety of free-flowing materials. 72p.—Sprout, Waldron & Co., Muncy, Pa. (441)

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ing machinery, packaged plants, and size reduction equipment. 24p.—Daffin Mfg. Co., Lancaster, Pa. (442)

**Milk Treating.** Details unit for removal of volatile feed flavors from milk. 8p.—Creamery Package Mfg. Co., Chicago. (443)

**Filters.** Describes company's equipment. 8p.—Commercial Filters Corp., Melrose, Mass. (444)

**Color Sorting.** Details unit for automatic checking of fresh fruits and vegetables. 4p.—Electric Sorting Machine Co., Houston, Tex. (445)

## PACKAGING

**Fillers.** Details equipment for handling containers up to 1 gal. 8p.—Arthur Colton Co., Detroit. (446)

**Capping Equipment.** Describes line of cappers, cap feeders, and escalator cap lifts. 8p.—Pneumatic Scale Corp. Quincy, Mass. (447)

**Adhesive Applicator.** Details new hot-melt system for moisture and sift-proof closures on Multiwall bags. 4p. —United Shoe Machinery Corp., Boston. (448)

**Baked Goods Packaging.** Illustrates and describes automatic equipment for high-speed assembling and wrapping. 4p.—Hayssen Mfg. Co., Sheboygan, Wis. (449)

**Plastic Containers.** Contains selection, purchasing, and handling data of molded models. — Florsheim Mfg. Co., Chicago. (450)

**Wrapping System.** Describes versatile, automatic machine. 6p.—Container Corp. of America. (451)

## MANAGEMENT

**Plant Safety.** Pamphlet uses humor to treat grim subject —loss of fingers.—National Safety Council, Chicago. (452)

**Filing Cabinets.** Describes features of Aristocrat IV models. 12p. — Remington Rand, N.Y.C. (453)

**Plant Location.** Folder explains firm's services for locating proper sites. 6p.—Niagara Mohawk Power Corp., Syracuse, N. Y. (454)

**Industrial Relations.** Lists NAM publications for management understanding. 10p. —National Assn. of Manufacturers, N.Y.C. (455)

## MARKETING

**Consumer Analysis.** Brand preference of 95 grocery products in Minn., S. D., and N. D. farm markets. 108p.—The Farmer, St. Paul, Minn. (456)

**Shopping Trends.** Analyzes cultural and economic factors behind increasing "shopper sophistication" and its effect on manufacturer's merchandising. 64p. — Doyle Dane Bernbach, Inc., N.Y.C. (457)

**Marketing Legislation.** Lists proposed Congressional marketing legislation, including pricing, trade relations, product control, advertising, etc. 12p. — National Assn. of Manufacturers, N.Y.C. (458)

**TV Guide.** Basic information on major rating services, including monthly report schedules. 46p.—Television Bureau of Advertising, N.Y.C. (459)

**Marketing Aids.** Checklist includes periodic reports concerning trends affecting producer, distributor, and consumer. 38p.—USDA, Washington, D. C. (460)

**Copyrights.** Guidance on protection of materials used in advertising, labeling, etc. 8p.—Small Business Administration, Washington, D. C. (461)

## MATERIALS HANDLING

**Stackers, Casers.** Depicts firm's line of stackers, unstackers, casers, and combination caser-stackers for both glass and paper operations. — Creamery Package Mfg. Co., Chicago. (462)

**Trucks.** Pros and cons for both walkie and rider types, with convenient check list for analyzing requirements. 4p.—Automatic Transportation Co., Chicago. (463)

**Chain Hoists.** Gives standard specs for hand-operated units. 8p.—Hoist Mfgrs. Assn., Washington. (464)

**Floor Conveyor.** Describes pushbutton unit for truck or trailer vans. 4p.—H. S. Watson Co., Toledo. (465)

**Cotton Belting.** Handbook

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Full 360° screen is an exclusive Stokes feature. Shown are two of the many screen sizes available.

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**a wide range of wet and dry food materials**

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For complete details, including specific performance comparisons on typical materials, write today for Bulletin 350.

**Average, based on processing of dry granulation*

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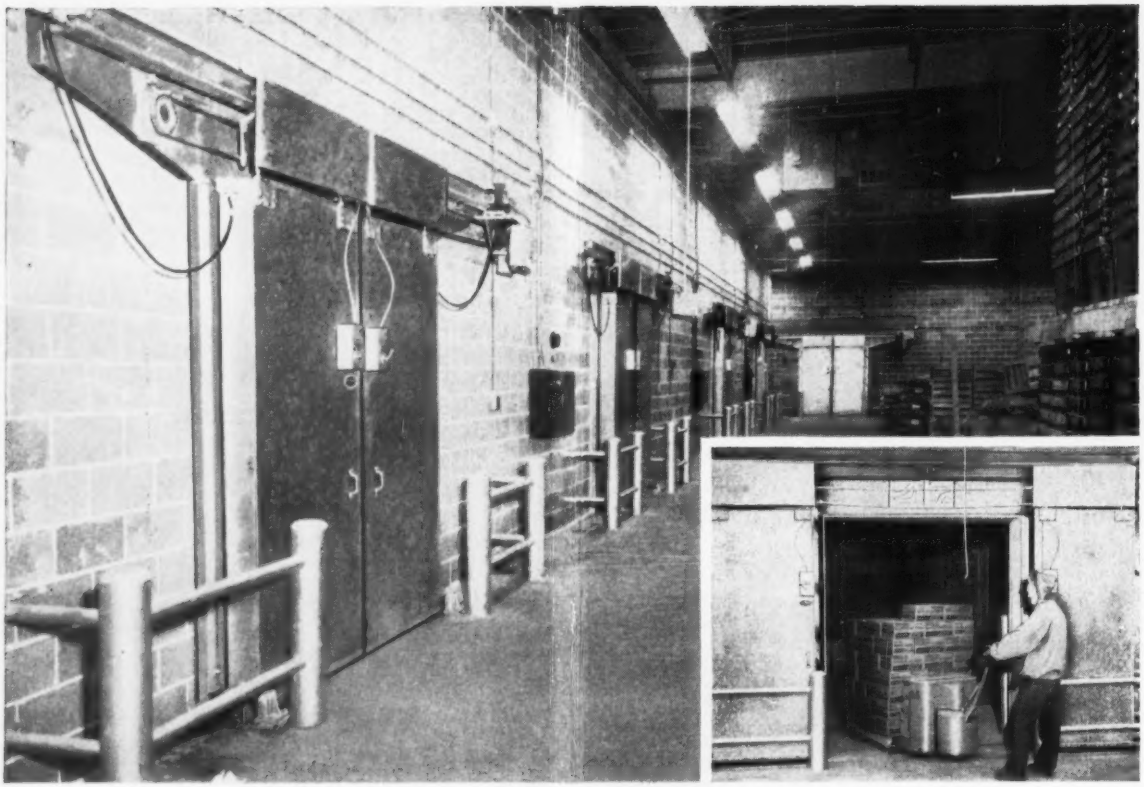
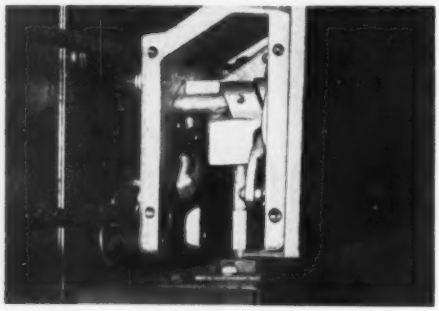


# 9 Jamison **Electroglide**® Doors handle heavy traffic—save refrigeration



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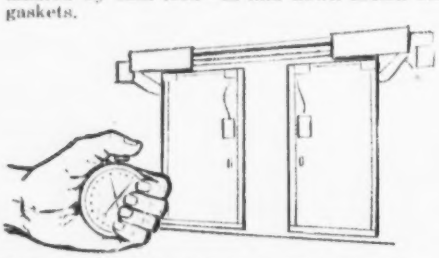

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• In Wichita, Kansas, at the big Safeway Cold Storage Warehouse, nine Jamison Electroglide Power Operated Cold Storage Doors demonstrate how they permit high volume, high speed warehouse operation.

Exclusive Jamison features of the Electroglide assure fast, positive operation with safety to personnel.

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**JAMISON**

COLD STORAGE DOORS

gives specs and uses of solid woven material. 18p. —Woven Fabric Mfgrs., Assn., NYC. (466)

**Belt Conveyor.** Gives data and advantages of sectional model. — Stephens-Adamson Mfg. Co., Aurora, Ill. (467)

**Loading Docks & Yards.** Contains facts and figures for in-and-out-efficiency. 8p. —Kelley Co., Milwaukee. (468)

**Lift Truck Uprights.** Describes single upright, box section for clear visibility. 4p.—Hyster Co., Danville, Ill. (469)

**Tread Wheels.** Gives specs and features of Alathane tread material for noiseless, high-capacity use. 4p.—Albion Industries, Albion, Mich. (470)

## SANITATION & MAINTENANCE

**Fly Killer.** Dry bait that attracts and kills them.—Camp Chemical Co., Brooklyn, N. Y. (471)

**Deodorizer.** Describes all-purpose, electrostatic unit. 2p. — Morris Deodorizers, Inc., Knoxville, Tenn. (472)

**Water Conditioner.** Details soluble, complex, nontoxic, crystalline phosphate for equipment protection. — Stiles-Karlsonite Corp., Waukegan, Ill. (473)

**Protective Coating.** Recommended for corrosion problem floors, walls, machinery, and equipment in food plants. 4p.—Garland Co., Cleveland. (474 )

**Management Counselor.** Explains work standards system of cost control in cleaning. 4p. (every two months) — Industrial Sanitation Counselors, Louisville, Ky. (475)

**Cleaning Compounds.** Details firm's line of equipment and compounds for poultry and egg processors. 8p.— Oakite Products, Inc., N.Y.C. (476)

**Impervious Insulation** system for motor and generator stator coils detailed. 6p.— Allis-Chalmers Mfg. Co., Milwaukee. (477)

**Open Flooring.** Describes use of electroforged grating in food industries, with information on types and spacing, bearing bar surfaces and


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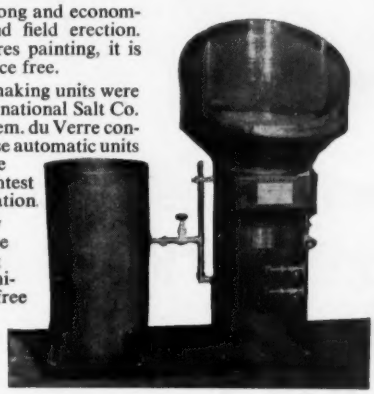

Let us show you how du Verre can improve your food processing operation for contamination-free, trouble-free service. Write for Bulletin No. 100.

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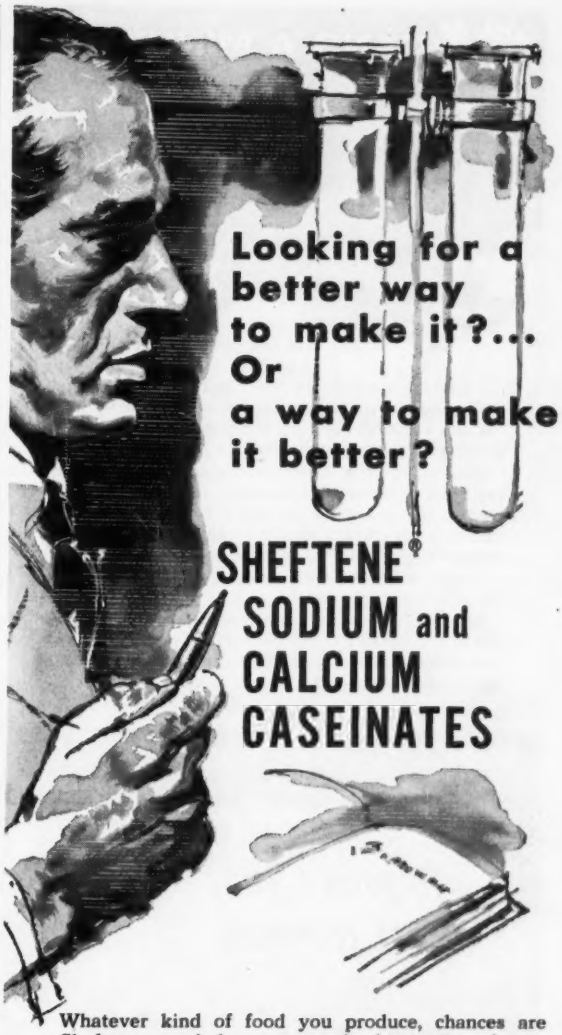
CIRCLE 235 ON READER SERVICE CARD



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Primarily Sheftenes are known as a high-quality protein supplement, rich in lysine and other essential amino acids. But they offer a wide assortment of functional advantages as well.

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As a fat-blocking ingredient to prevent excessive absorption of fat in frying of doughnuts.

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**Infant Foods:** As a high-quality, high-protein supplement in infant and special dietetic products.

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Ideal for canners, frozen food processors, bakers, or any users of liquid or semi-paste product . . . for any product that will drain through a 4" opening. Provides cleaner, more efficient handling—no loss due to spilling or splashing of product. Equipped with stainless steel underpan 60" x 20" x 15" wide, ¾ hp motor, 806 lbs. net weight, pump optional.

The "101" Automatic Can Opener is one of a complete line of Langsenkamp machines for food processors which also includes manually-operated can openers and automatic can crushers. Write for full details.

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weights, fastening methods, safe loads, etc. 24p.—Blaw-Knox Co., Pittsburgh. (478)

**Corrosion Control.** Manual of protective coatings, features colorful paint system. 38p. — Rust-Oleum Corp., Evanston, Ill. (479)

## INSTRUMENTS

**Dial Indicators.** Details new process variable unit. 6p.—Taylor Instrument Co., Rochester, N .Y. (480)

**Measuring-Testing.** Gives photos and specs of full line of amplifiers, recorders, transducers, etc. 48p.—Minneapolis-Honeywell Regulator Co., Philadelphia. (481)

**Level Indicator.** Details new automatic bin-level unit. 4p.—Bin-Dictator Co., Detroit. (482)

**Flow Meters.** Illustrates and describes new line of purge meters. 4p.—Wallace & Tiernan, Belleville, N. J. (483)

**Micrometers.** Brochure gives specs of firm's complete line. 6p.—J. T. Slocomb, S. Glastonbury, Ct. (484)

**Electronic Batch Counter.** Describes redesigned Tally-Count. — Standard Instrument Co., N.Y.C. (485)

## INGREDIENTS

**Flavors, Oils, Chemicals.** Catalog lists firm's full line of ingredients. 30p.—Ungerer & Co., N.Y.C. (486)

**Sweet Dairy Whey.** Details uses and features of this dairy ingredient. 4p:—Western Condensing Co., Appleton, Wis. (487)

**Resins & Celluloses.** Details full line of ion-exchange materials. 8p.—Bio-Rad Labs, Richmond, Calif. (488)

**$CO_2$.** Describes meat-packing uses of dry-ice, bulk liquid, and gas forms. 10p.—Pure Carbonic Co., N.Y.C. (489)

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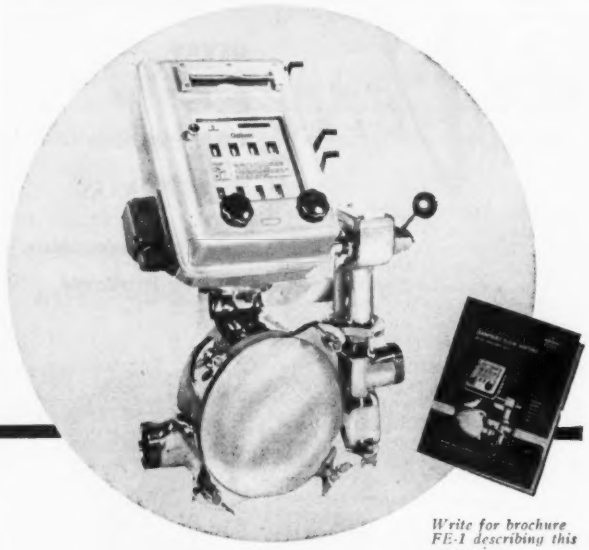

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1. Weight of batch ingredient.
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3. Optical check of furnace temperatures.
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dietetic fruit jells...aspics...
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NOW you can make delicious sugar-free gelled foods that even the most conscientious weight-watcher or diabetic can enjoy—with Exchange Low Methoxyl Pectin...the only pectin that forms a true gel without sugar.

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# USEFUL NEW BOOKS

### Product Planning Guide

DEVELOPING A PRODUCT STRATEGY. *American Management Assn., 1515 Broadway, N. Y. 36, N. Y. 1959. 352p. Price:* $7.50.

This latest AMA report shows how top management, finance, research, engineering, production, and sales all have a hand in product development.

Specific programs are reported, including General Foods, National Dairy, IBM, etc.

Further, the book discusses advantages and limitations of using these outside research facilities: individual consultants, commercial testing labs, university facilities, and industrial research labs.

### Latest Nutrition Reference

PROTEIN AND AMINO ACID NUTRITION. *Ed. by Anthony A. Albanese. Academic Press, NYC. 1959 604 p. Price:* $16.

Here is a one-volume collection of detailed presentations on current knowledge of the protein and amino acid makeup of nutrition.

Sixteen chapters cover various corners of the subject in analytical studies by leading nutrition experts and scientists.

### Businessman's Data Guide

BUSINESS STATISTICS (1959 *Ed.*). *U. S. Dept. of Commerce, GPO, Washington 25, D. C. 350p. Price:* $2.25.

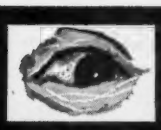
Containing 2,600 statistical measures of the U. S. economy, this reference is a valuable tool for comprehensive economic research.

All major business indicators are included as well as a study of U. S. economic progress in the last 30 yr.

### Booklets & Reports

THE HAWAIIAN MARKET. *J. Walter Thompson Co., 420 Lexington Ave., N. Y. C. 1959. 44p. Price:* 80¢. Contains latest area and market data on the 50th state.

VOCATIONAL AND PROFESSIONAL MONOGRAPHS (CANNING INDUSTRY) *by Nelson H. Budd. Bellman Pub. Co., Cambridge 38, Mass. 36p. Price:* $1. Discusses employment qualifications and opportunities in the canning field.

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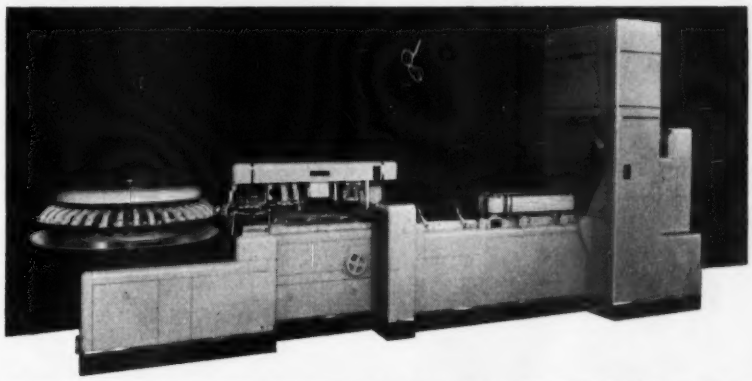

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# RECENT INVENTIONS

## PRODUCTS

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**Frozen Eggs** Containing Isopropyl Alcohol Mono-Ester of Citric Acid.–B. R. Harris, Glencoe, Ill. No. 2,902,372.

**Milk Modified** by Separating Casein From Skim, Salt-Precipating and Filtering Lactalbumen, Remixing Whey With Casein.–R. J. Block, Borden Co., N.Y.C. No. 2,903,358

**Edible Oils Improved** by Adding an Amine to Coconut or Palm Kernel Oils.–G. C. Hampson, Lever Brothers Co., N.Y.C. No. 2,903,369.

**Gravy** or Sauce Mix Comprising Cereal, Leavening and Separating Components. —H. M. Keller, General Mills, Minneapolis. No. 2,909,431.

**Fluid Shortening** Containing Liquid Oil and Non-Fish Oil Stearine.—L. L. Linteris, Lever Brothers, N.Y.C. No. 2,909,432.

**Milk-Like Product** That's Aqueous Extract of Desiccated Coconut.—R. H. Powley, Skinner Corp., Seattle, Wash. No. 2,910,364.

## PROCESSING

**Preserving Prunes** by Treating in Alkali Solutions Before and After Dehydrating.–E. A. Bozzo, Gilroy, Calif. No. 2,897,088.

**Making Hard Butter** From Glyceride Oil.–G. Barsky, E. F. Drew & Co., N. Y. C. No 2,898,211.

**Incorporating Ascorbic Acid** and Catalase Enzyme in Package to Retard Color Fading of Cured Meat – F. C. Olson, Oscar Mayer & Co., Chicago. No. 2,898,212.

**Retaining Moisture** of Ground Meats by Adding Carotene-Free Carrot Pulp Residue.–W. J. Zick, Crete, Ill. No. 2,899,311.

**Improving Whipping Properties** of Egg Albumen by Adding Alkali Metal Salt of Capric Acid and Adjusting pH to 6.0-7.5.–J. H. Silliker, Swift & Co., Chicago. No. 2,899,312

**Fermenting Cucumbers** in Sugar-Vinegar Solution to Produce Pickles With Low Sodium Content–V. R. Rohrkaste, Edwardsville, Ill. No. 2,899,314.

**Granulated Products** by Moistening and Agglomerating Powders Into Clusters.–E. C. Scott, Brookfield, Ill. No. 2,900,256.

**Controlling Eyes** in Swiss Cheese by Treating Raw Milk With Hydrogen Peroxide Before Inoculating. Z. D. Roundy, Armour and Company, Chicago. No. 2,900,257.

**Soybeans Debittered** by Treating With Enzyme-Enriched Water and Low-Temperature Drying.–K. Hirose, Yokohama City, Japan. No. 2,901,353.

## PACKAGING

**Encasing Sausages** in Polyphosphate to Prevent Fat-Water Separation.–F. C. Olson, Oscar Mayer & Co., Chicago. No. 2,888,351.

**Bacon Package** Comprising Cardboard Base and Separator for Slices.–R. B. Estes, Knoxville, Tenn., No. 2,888,352.

**Method** of Sealing Fill in an Evacuated Plastic Film Wrapper.–C. E. Cloud, Wilmette, Ill. No. 2,888,787.

**Liquid-Filling** System Comprising Reservoir and Superimposed Body of Constant Pressure Gas.–R. H. Breeback, Crown Cork & Seal Co., Inc., Baltimore. No. 2,888,944.

**Carton Filler** Consisting of Rotating Wheel With Pockets for Delivering Products Into Conveyed Cartons.–R. Guyer, Waldorf Paper Products, Ramsey, Minn. No. 2,888,963.

**Container Conveyor** and Controller for Product-Dispensing and Weighing Devices.–F. L. Hopkins, Bemis Bro. Bag Co., St. Louis. No. 2,889,031.

**Machine-Bagging Frankfurters.** –J. R. Litty, Goshen, N.J. No. 2,892,186.

**Packaging Liquids** in Heat-

(*Continued on p.* 149)

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Valley Fresh Sweet Dairy Whey, an excitingly different dairy ingredient, contributes to the taste, texture, shelf life and finished color of almost every known food product. And as others have found out...formula costs decrease.

This pure 100%, high quality, dairy ingredient goes into solution instantly and uniformly. Pound for pound, it provides a higher content of lactose (milk sugar) and lactalbumin protein than any other natural fraction of milk. Use Valley Fresh Sweet Dairy Whey to improve all your products, whether wrapped, canned, boxed or in a jar.

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ADAPTABLE TO ANY CONDITION OR CAPACITY REQUIREMENT...

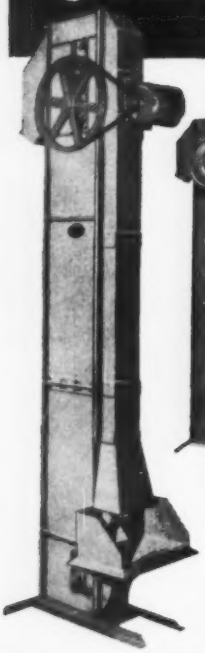

Fig. A

Fig. B

Fig. C



Fig. D

AVAILABLE WITH HOLDING OR FEEDER-HOPPERS IN SIZE OR TYPE DESIRED

Fig. A. Standard Small Production Type Hopper. Fig. B. Large Holding Hopper. Fig. C. with Portable VIBRA-FLEX Feeder-Hopper. Also available with Gear Motor Drive as in Fig. D.

MEYER bucket elevators are furnished in low speed models, in any height or capacity, for gently handling bulk material without breaking or jamming. Intake design prevents material from falling into elevator boot, and positive discharge prevents inter-mixing when various products are alternately run in the same elevator. Built of heavy gauge steel with sealed, self-aligning bearings throughout for continuous heavy duty operation. They are available with Cast aluminum alloy, or fabricated stainless or mild steel buckets mounted on heavy duty roller chains.

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CIRCLE 238 ON READER SERVICE CARD

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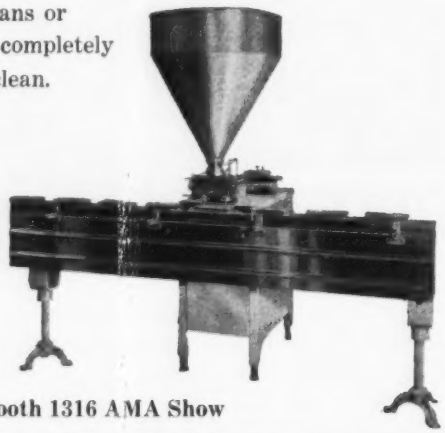
## the SIMPLEX TWIN

Top efficiency with this fully automatic Simplex Model T. A universal machine to handle cartons, cans or jars. No can no fill, completely adjustable, easy to clean.



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KLENZADE

# Tri-Chloro-Cide

**Non-Corrosive for All Stainless Steel Processing Equipment**

NO FILM
NO SEDIMENT

*Sparkles in Hardest Water!*

## HIGH GERMICIDAL STRENGTH

Klenzade has greatly reduced the corrosion problem common to ordinary chlorine sanitizers with Tri-Chloro-Cide — a high powered stable chlorine powder that won't pit or corrode stainless steel. Tri-Chloro-Cide is an *organic* chlorine that produces a clear, sparkling solution of exceptional germicidal strength . . . even in hardest water! Tri-Chloro-Cide is perfect for fogging or rinsing. Leaves no film or sediment. Remarkably stable, quickly soluble, excellent shelf life.

MAKE EQUIPMENT SAFE WITH **Tri-Chloro-Cide** ORGANIC CHLORINE

**KLENZADE PRODUCTS, INC.**

*Branch Offices Throughout America*

**BELOIT, WISCONSIN**

## Recent Inventions

Sealable Materials.—E. Tebbutt, Rose Brothers, Ltd., Gainsborough, England. No. 2,893,187.

**System** for Meter-Filling Cheese Curd Into Containers.—N. E. Spiess, Jr., National Dairy Products Corp. No. 2,893,609.

**Packaging Fresh Meats** in Plastic Tray Overwrapped with Heat-Sealable Transparent Film.—K. R. Nickolls, Monsanto Chemical Co., St. Louis. No. 2,893,877.

**Sealed Can** Having Flexible End Closures to Permit Canned Product to Develop Internal Pressure.—J. G. Shakman, Pabst Brewing Co., Chicago. No. 2,894,844.

**Novelty Package** Comprising Shelf Mounted Within Box.—M. Brav, Sue Ann Food Products Corp., Chicago. No. 2,895,834.

**System** for Counter-Pressure Filling Pasteurized Carbonated Beverages Into Sterilized Containers.—B. Kaiser, Hamburg, Germany. No. 2,897,082.

**Tubular Package** for Sausage Meats Comprises Overlapping Edges With Longitudinal Thermally Sealed Strip Weakened by Layer of Bond-Resisting Material.—J. R. Lawlor, Tee-Pak, Inc., Chicago. No. 2,897,087.

**Multiple Compartment Container** With Pouring Spouts.—M. H. Klausmann, Seal-Spout Corp., Newark, N. J. No. 2,898,004.

**Frozen Confection Package** With Projecting Stick to Break Package Web Formations and Remove Individual Confections on Stick.—A. S. Ensler, Joe Lowe Corp., N.Y.C. No. 2,898,213

**Canning Partially Cooked Rice** Coated With Solution of Edible Oil and Emulsifying Agent to Prevent Grains From Sticking.—R. E. Ferrel, USDA. No. 2,898,215.

**Bottle-Handling Machine** Comprising Crate- and Bottle-Supporting Station and Transfer Means.—J. F. Cella, Cella Machinery, Inc., N.Y.C. No. 2,898,715

**Filler** With Multiple Vacuum-Filling Heads.—W. Berthelsen, Pneumatic Scale Corp., Quincy, Mass. No. 2,898,953.

**Continuous Griddle** Cake-Baking Unit Comprising Depositor, Plates Carried on Conveyor and Means for Heating Plates and Inverting Cakes.—F. C. Van Arsdell, Quaker Oats Co., Chicago. No. 2,899,914.

### EQUIPMENT

**Packer** Comprising Product-Loading Conveyor Adaptable to Enter Empty Container.—E. G. Griffith, Downey, Calif. No. 2,889,676.

**Panner** for Automatically Depositing Twisted Bread Into Pans.—W. O. Sexauer, J. H. Day Co., Norwood, Ohio. No. 2,893,534.

**Feather Plucker** Comprising Rotating Cylinder and Flexible Plucking Fins.—C. G. Hancock, Norman, Okla. No. 2,894,279.

**Continuous Method** of Feeding and Separating Yeast-Raised Goods on Trays During Depositing, Proofing, Cooking and Cooling.—H. T. Hunter, DCA Food Industries, N.Y.C. No. 2,897,772.

**Hog Polisher** Comprising Carcass Conveyor and Two Rotatable Polishers.—C. T. Fredrickson, Swift & Co., Chicago. No. 2,898,624.

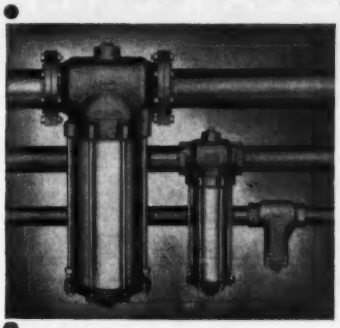
**Coffee Brewer** With Electro-Mechanical Timing Means.—C. R. Rockriver, Huggins-Young Co., Los Angeles. No. 2,898,843.

**Sprayer** for Coating Waxy Substances Onto Conveyor-Agitated Fruits.—J. B. Strayley, Brogdex Co., Pomona, Calif. No. 2,898,881.

**Meat Slicing Machine** With Hydraulic Pump and Measuring Means to Control Number of Slices.—A. H. Burnett, Swift & Co., Chicago. No. 2,898,962.

Want more information on any of those recent patents—if so you may obtain detailed printed copies by writing direct to The Commissioner of Patents, Washington 25, D. C., giving serial numbers of those you want and enclosing 25 for each copy.


**LINE STRAINERS**



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in stainless steel, cast iron and brass

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**TOP PERFORMANCE DESIGN**
Screen area so large that strainers will take 75% blocking with less than ½ lb. pressure drop under normal flow conditions. Top and bottom flange collars on screen give seal fit and rigidity.

**SPRAYING SYSTEMS CO.**
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*Send New ADS or Inquiries to Class. Adv. of Food Engineering, P. O. Box 12, New York 36, N. Y., For April Issue Closing March 25th*


Leading flavor manufacturer in Western Germany is seeking a thoroughly qualified **EXPERT** experienced in the production and development of brandy-flavors and basic substances

An interesting position with freedom for individual initiative. Good salary and advancement opportunities. Apartment and official working permit will be provided. Must be able to speak German fluently.

Send complete resume, photograph, references and salary expected to . . . P-3843, FOOD ENGINEERING
Classified Advertising Division, P. O. Box 12, New York 36, N. Y.


*ADDRESS BOX NO. REPLIES TO: Box No. Classified Adv. Div. of this publication. Send to office nearest you.*
*NEW YORK 36: P. O. Box 12*
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*SAN FRANCISCO 4: 68 Post St.*

### POSITION VACANT

**Food production man and practical chemist** for manufacturing line of specialties such as preserves, syrups and flavors; state age, physical description, experience, salary desired. P-3718, Food Engineering.

**Industrial Jr. Engineer. New plant layout.** Methods evaluation. Cost reduction programs. Opportunity to learn. . . . are all available to recent Engineering Graduate with training and interest in Industrial Engineering. We prefer a man with 1 to 2 years' appropriate industrial or military experience. We can offer real prospects for advancement to plant supervision and management. Career opportunity with multi-plant Philadelphia Division of major food industry. Salary to $7600. Write to X-4, P. O. Box 2068, Phila. 3, Pa.

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**Mechanical Engineer . . . variety of duties** and responsibilities in design, selection and modification of dairy product processing and packaging machinery and material handling equipment. Excellent chance to learn and advance in Philadelphia Division of top notch company offering stable employment. Requires recent BS in engineering and 2 to 5 years' experience in mechanical design or development. Starting salary to $7500. Send complete resume to Y-41, P. O. Box 2069, Phila. 3, Pa.

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**Sales Representative . . . to service ice cream** and candy manufacturers, bottlers, and other processors of foods. Excellent opportunity with progressive flavor manufacturer. Write age, education, previous experience, and other pertinent data. RW-3622, Food Engineering.

## CHIEF ENGINEER
and
## MANAGING DEVELOPMENT ENGINEER

**Due to promotions,** there are two positions open in a major operation of America's most exciting Corp. Major Products: Agricultural, canning, carton, warehouse, and restaurant equip.

**Seeking applicants for CHIEF ENGINEER'S** position who can direct Development Eng. in machinery design. Supervisory experience desirable, but not essential. Need leader more than inventor type. Real opportunities to develop into top-notch Corporate Executive through practical training and formal college executive programs.

**The MANAGING DEVELOPMENT ENGINEER** will supervise the Can Handling and Warehouse Equip. programs. This is a new field with tremendous possibilities. Need a take-charge Engineer with some creative ability.

Small mid-western town of 6,500. Good schools, churches, park, country club. Two hrs. from Chicago, one hr. from Purdue U. and U. of Ill. **Contact R. F. Hartman, Personnel Mgr. Canning Machinery Div., Food Mach. & Chem. Corp., Hoopeston, Ill.**

## QUALITY CONTROL

**An excellent opportunity with growing company for food technologist with some meat processing experience to gradually assume position as quality control and product development manager. Desirable location in northeast. Salary open. Reply giving full particulars. All replies confidential.**

P-3561, Food Engineering
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**Of 8 to 10 years industrial experience to assume position of senior responsibility in quality control and development for multi-plant food processing operations involving canning, freezing and dehydration.**

**Reply to:**
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*WANTED*
## STANDARD KNAPP 429 CASE SEALERS
—OR PACKOMATIC MODEL D
ADVISE SERIAL NUMBERS.
LENGTH OF COMPRESSION UNIT.
**HAROLD R. SIBNER**
**43-34TH STREET, B'KLYN 32, N. Y.**
**ST 8-1550-51**

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## Have Cash-Will Buy
YOUR IDLE MACHINERY
ME MACHINERY AND EQUIPMENT CO.
123 Townsend St. • San Francisco 7, Calif.

CIRCLE 701 ON READER SERVICE CARD

## COMPLETE MANUFACTURING SERVICES
## PRIVATE LABELING—FORMULA DEVELOPING

**PACKAGING—SYRUPS, SAUCES, EXTRACTS, VINEGARS, FRUIT DRINKS, ETC.**
**COMPLETE AUTOMATIC EQUIPMENT, SHIPPING FACILITIES, WAREHOUSING.**
**NOW PACKING FOR PROMINENT WHOLESALERS, DISTRIBUTORS, AND FOOD CHAINS**
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**DERRY PRODUCTS, INC.,** 31 Moore St., Brooklyn 6, New York, N. Y., STagg 2-4982

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**IOWA MACHINE WORKS & FOUNDRY**

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AT Boscobel, Wisc.

31 Acres with 50,000 sq. ft. floor space, 2—400 HP Boilers, 1500 gal. per min. well, sewage disposal system, 2090 sq. ft. loading dock, CMST. P & Pac. side-track. Outside city limits. Ideal for dairy ind., food processing, or light mfg. Also has ss cyclone spray dryer.

*For appt. contact*
**Jerome J. Ungs,**
**Luxemburg, Iowa**
*Phone UL 3-2555*

CIRCLE 704 ON READER SERVICE CARD

## STAINLESS STEEL TANKS

Oxygen cylinder, J-1, 24" x 45", 77 gal., 18,000 cu. in., 400 PSI 10 gauge, type 304. Value $300.

**Brand NEW $99.50**

Ship. wt. 250 lbs.

Model F-1, 8½" x 18", wt. 14 lbs., 1,000 cu. in. type 302 and 304, gauge 16. Packed 8 to carton. **NEW $14.50**

Air Force surplus. Ideal for chemicals, gases, pneumatic use, hydraulic, liquids, etc. Prompt shipment. Terms 30 days net, F.O.B. Baton Rouge, La.

**ILLINOIS MFG. & SUPPLY CO.**
1829 S. State Street, Chicago 16, Illinois, Dept. 10
Phone VIctory 2-6633

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**—to help you get what you want—to help you sell what you no longer need.**

**Take Advantage Of It**

*For Every Business Want*

**"THINK SEARCHLIGHT FIRST"**

## *Best* EQUIPMENT OFFERINGS

**SPECIAL:**

8—Sanitary stainless PREHEATERS or EXCHANGERS, shell and tube type, 50 to 250 sq. ft. multi-pass, quick opening heads. For vegetable juices, fruit juices, beverages, soups, dairy products.

1—EVAPORATOR, Mojonnier TRIPLE EFFECT (1550 sq. ft.) with FINISHING PAN (150 sq. ft.) and three PREHEATERS (385 sq. ft.). All stainless sanitary T304.
1—EVAPORATOR, Arthur Harris Co. Single Effect S.S. T304 sanitary having 696 sq. ft. Complete.
1—EVAPORATOR, Mojonnier, 6 ft. dia. coil type having 261 sq. ft. sanitary S.S. T304.
1—EVAPORATOR, Rogers 5 ft. dia. coil type having 140 sq. ft. sanitary S.S. T304.
1—36" DIA. FINISHING PAN, S.S. T304, with 150 sq. ft. outside steam chest and condenser. Mojonnier.
7—STORAGE TANKS, sanitary S.S. T304, vertical. (2) 2,000 gal., (1) 2,800 gal., (2) 500 gal.
2—VACUUM TANKS, sanitary S.S. T304, 1500 gal. and 3,000 gal. with large amount of S.S. coils in each.
2—MIXING TANKS—500 gal. vertical, with vertical agitators and low pressure jackets, S.S. T304 sanitary.
5—LINED TANKS, (2) 7,750 gal. and (3) 6,650 gal. phenolic lined horizontal.
10—TRUCK TANKS, 1,000 gal. to 2,500 gal. one and two compartments, sanitary S.S. insulated.
1—FITZMILL, Model D, S.S. T304, 5H.P.
8—DOUBLE DRUM DRYERS, 42 x 120, 42 x 100, 42 x 90, 36 x 120, 32 x 90, 32 x 72.
5—CENTRIFUGES, 40" and 26" Tolhurst, suspended, perforated baskets.
2—HOMOGENIZERS, 1,000 G.P.H. Cherry-Burrel.
1—H.T.S.T. PLATE PASTEURIZER, 20,000#/hr. S.S. T304, complete system, Cherry-Burrell.

Arthur Harris DOUBLE EFFECT EVAPORATOR, S.S. T304, sanitary having 1013 sq. ft. Handled 16,500#/hr. of feed from 8.6 to 42% solids. Condenser, vacuum pump, valves.

**BEST EQUIPMENT COMPANY, INC.**
1737 W. HOWARD ST. CHICAGO 26, ILL.
AMbassador 2-1452

CIRCLE 707 ON READER SERVICE CARD

## SPECIAL OFFERINGS

200 gal. S.S. Jacketed Kettle, 3 H.P. agitator
3000 and 3400 gal. S.S. Insul. Tanks
2000 to 3100 gal S.S. Truck Tanks
300 gal. S.S. Tanks top agitator
S. S. Plate Cabinet & Surface Type Heat Exchangers
Worthington Air Compressor 3 H.P.
1½" x 2" Waukesha Sanitary Pumps
50 gal. S.S. Tank, beater type agitator
30 and 50 H.P. Clayton Boilers
3 x 3 and 6½ x 6½ Ammonia Compressors
125 to 1500 gal. S.S. Homogenizers
80 qt. 2 H.P. Hobart Mixer
3 line Hops Filler
36" S.S. Vacuum Pan
Fillers for Milk Bottles & Containers
40 qt. Emery Thompson Batch Freezers, Ammonia & Freon
5, 10 & 15 H.P. Freon Compressors
20' Coal Conveyor

**LESTER KEHOE MACHINERY CORPORATION**
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Gibraltar 7-3410

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The Ruderman Machinery Exchange of Gouverneur, N. Y., one of the largest diversified Machinery & Equipment Dealers in America, can furnish you with practically all your needs in Modern Ice Cream, Milk Plant and Electrical Equipment at but a fraction of the original cost.

WRITE—WIRE—PHONE FOR YOUR NEEDS

**RUDERMAN MACHINERY EXCHANGE**
Gouverneur, New York Telephone 333-334

CIRCLE 709 ON READER SERVICE CARD

*FOR SALE*

Hayssen Model 5-9 Automatic Wrapper
Model MPUS-15 Miller Wrapper
Model MPUS-17 Miller Wrapper & Sheeter
20-gal. Stainless Steam Jacket Kettle with 1½" outlet for 100-lb. WSP.
300-gal. Copper Still with Condenser and Tank.
100-gal. Read Jacketed Double Armed Dough Mixer.

**SAVAGE BROS. CO.**
2638 Gladys Ave. Chicago 12, Ill.

CIRCLE 710 ON READER SERVICE CARD

FMC

## CHECK the EQUIPMENT OF INTEREST TO YOU: QUOTES BY RETURN MAIL

Stainless Steel Jacketed Kettles
Vertical and Horizontal Retorts
Tanks, Mixers, Agitators, Pumps
Langsenkamp S/S Lab Pulper
Indiana Brush Finisher
Amer. Utensil "B" Juice Extractor
Langsenkamp Colossal Paddle Finisher
Sterling, Blakeslee Peelers
Urschel Model 6 Dicer
Anderson Model 4 Dicer
FMC #50 S/S Juice Extractor
FMC Cont. Abrasive Peeler
M & S 6 pocket Filler #10 Cans
M & S S/S 10 Pocket Piston Filler
Filler Machine Piston Fillers
FMC Hand Pack Model 23 Filler
Berlin Chapman S/S Juice Filler
Horix 14 and 21 Spout Fillers
Kiefer Vari-Visco 2 Stream Filler
MRM 12 Spout S/S Rotary Filler
Pneu. Scale Aut. Bottle Cleaner
U. S. Sanitair DS8 Bottle Cleaner
CRCO Model NWS Jar Cleaner
Capem C-4-F 120 BPM Screw Capper
Capem B-2-F 120 BPM Screw Capper
Resina Single Hd. Screw Capper
U. S. Bottlers RC8 Screw Capper
Pneumatic Scale 4 Head Capper
Standard Knapp, Burt, FMC and Kyler Wrap Around Labelers
Pneumatic Scale Duplex Labelers
N. J. Pony #86 Label Dri Labeler
N. J. Pony 165 Aut. Labeler
World Semi and Aut. Labelers
Selectro Dewatering Screens
Heat Exchangers—all Sizes & Types
Freon and Ammonia Refrigerating Compressors
CCC Panama Can Closer 306-S1
Bliss #25 Aut. Double Seamer
Max Ams 98C Semi-Aut. Seamer
Canco Seamers Models 006 and 08
Standard Knapp Automatic Top and Bottom 429 Gluer & Sealer
Standard Knapp "F" Case Packer
Burt PCE Caser for 303 cans
Standard Knapp Model 806 Packer
FMC "Neverstop" Carton Filler and Sealer
Johnson Aut. Cellophane Wrapper

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BROOKLYN 15, N. Y.
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Atomizer: Mikro type 5MA, st. steel.
Cappers: Resina, Pneumatic Scale Swanson, Capem, Centrifugal: Tolhurst 20" type 316 st. st.
Crystallizers: 550 gal. st. st. jktd. agit.
Deodorizer: Rogers stain. steel.
Disintegrators: Rietz RD 18-P, steel, 75 hp.
Dryers: Devine 2 x 4 vac. drum st. steel.
Dryer: Stokes Vacuum 2-shelf model 51.
Evaporator: Buflovak st. st. 94 sq. ft.
Filler: Mojonnier #90, 14 head, st. st.
Fillers: liquid vacuum, siphon, gravity.
Fillers: Stokes, Colton, Elgin, Geyer, M&S.
Fillers: powder Speedee, Triangle, Stokes & Smith.
Filter Press: Sperry Shriver 6"-36".
Filters: Int. pressure—Alsop, Sparkler, Lomax.
Gluer, carton: Stand Knapp, Ferguson, Triangle.
Homogenizers: 25, 60, 125 GPH.
Kettle: Groen 300 gal. st. st. 3 hp.
Kettles: Stain Steel with or without agitators.
Kettles: 20 gal. Groen gas fired, st. steel, (New).
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Labeler: World auto. straightway.
Mills, hammer: Mikro, Gump, Prater, Raymond JayBee, Jeffrey, Williams, Fitzpatrick.
Cog, stain. steel, 10 hp.
Enterprise vertical 15 hp.
Mixers, dough type: single and double arm.
Glen Power Plus 340 qt 5 hp.
Powder: 50 to 2000 lb. capacity.
Readco 140-qt. 4-speed.
Mullers: Simpson Lab., 18", Porto 39½".
Packager: Transwrap model B.
Vacuum Pan: Rogers 6' st. steel.
Vacuum Pan: Harris 42" st. steel.
Pasteurizers: Cherry Burrell 200 gal., 33 gal.
Percolators: Pfaudler 54" x 42" stain. steel.
Pumps: Centrifugal, rotary, gear vacuum.
Pulper: FMC, MC-664, 30 hp.
Riving Mch: Fitzpatrick model 8 st. steel.
Screen: Rotex model 41 st. steel.
Tablet Presses: Stokes DD2 23 station.
Tanks: Stain. steel 25 gal. to 1200 gal.
Tank: Pfaudler 2500 gal. glass lined.
Truck Tanks: stain. steel, 1200, 1600 gal.

Send us your inquiries and list of idle equipment

**LOEB EQUIPMENT SUPPLY CO.**
820 WEST SUPERIOR ST. • TELEPHONE SEeley 8-1431 CHICAGO 22, ILLINOIS

CIRCLE 712 ON READER SERVICE CARD

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### IMMEDIATE DELIVERY

Stainless steel round tanks, 6500 gal., 3800 gal., 4500 gal.
Tablet Presses: Colton, Model 3½T; 3 RP; 4½T; Kux high speed rotary model 25.
Screens: Rotex model 41, two deck; Selectro, 3 deck, 1½' x 4'; Selectro S/S two deck 1½' x 4'; Selectro S/S single deck, 2' x 4'.
Pasteurizers: Pfaudler 100 gal.
Vacuum Pan: Mojonnier S/S 6' size.
Mixers: Ribbon type, 10 cu. ft. S/S; 36 cu. ft. jacketed; 75 cu. ft. and 165 cu. ft.
Mills: Mikro 2TH; Fitzpatrick Model D S/S; Prater Model 009 125 H.P.; Jay Bee 75 H.P.
Kettles: 40 gal. S/S trunion type; Lee 75 gal. pressure cooker. In stock: 20 to 100 gal. S/S Model N, Groens.
Gluers: Ferguson Model D; ABC Model A; ABC Model XSA; ABC model XSSA.
Filters: Sparkler 33-9 S/S.
Fillers: Stokes & Smith Model G I S/S; Speedee Volumetric; Filler Machine 8 ounce semi automatic piston.

Disintegrator: Rietz Model RD 18 P, 75 H.P.
Centrifugal: Tolhurst 20" type, S/S.

*Send us your inquiries*

**AARON EQUIPMENT CO.**
9370 Byron Street
Schiller Park, Illinois
*Gladstone 1-1500*

CIRCLE 713 ON READER SERVICE CARD

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### MODERN REBUILT MACHINERY

UNION Rebuilt Machinery

### AT Tremendous Savings

W. & P. 3000 gal. Jacketed Mixers.
Package Machinery Models FFH, FF, FA, FA-2, FA-3, FA-4 Wrappers. With and without Electric Eyes and Labeling Attachments.
Scandia SFS6F Automatic Wrappers with Electric Eyes, 140 per min.
Hayssen, Oliver, Package Machinery, Battle Creek, Hudson Sharp and Miller Wrappers—all sizes.
Pneumatic Scale High Speed Automatic Cartoning Lines, with and without Liners, Tite Wrap.
Standard Knapp 429, A-B-C, Ferguson Carton Sealers.
Ceco Model 390t and Model 40 Carton Sealers.
Baker Perkins, Day, W. & P. Heavy Duty Jacketed Mixers, 2 to 150 gal.
Resina RU-120 Straightline Capper.
Fitzpatrick Models D, D6, K, S.S. Comminuters.
Mikro Models ISH, 2TH, 3TH, 4TH Pulverizers.
Langsencamp Model A E-Z Adj. S. S. Pulper.
Mixers, Labelers, Fillers, Sifters, Grinders, Pulverizers, all makes, sizes and capacities.

*Complete Details and Prices on Request*

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167 N. May Street Chicago 7, Illinois SEely 3-7845

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### FOR SALE
### COMPLETE REFRIGERATION PLANT AND ICE MAKING EQUIPMENT

CONSISTING OF THE FOLLOWING ITEMS

1—Worthington Compound Horizontal Compressor driven by 150 HP 3 ϕ 60 r—4150 V Synchronous Motor.
1—Worthington Single Acting Horizontal Compressor driven by 75 HP 3 ϕ 60 r—4150 V Synchronous Motor Complete with Switch Gear and Exciters.
1—360 Cake (300#) Ice Tank—24 wide X 15 lg.
1—Shepard—3 ton Overhead Trolley Crane Complete.
2—5 HP Air Blowers.
1—Ice Scoring Machine.
2—Shell and Tube Brine Cooler.
2—5 HP Brine Circulating Pumps.

This equipment is in excellent condition and may be inspected while operating at Brant Beach, New Jersey Ice and Cold Storage Plant on Long Beach Island, New Jersey.

Offering Price—$28,500 Complete—Your removal.

Reply to Engineering Department

**MRS. PAUL'S Kitchens**
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*FOR SALE*

### BUCKET ELEVATOR

Jeffrey Stainless, 8x5 Buckets, 25' centers

NORTZ
67 Van Reipen Ave. Jersey City, N. J.

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### BEST BUY

### 316 S. S. HEAT EXCHANGERS

1—Alco Products 735 sq ft horiz. 200—1" O.D. tubes 16' long
3—Downington Iron Works, 52 sq ft. (ea). 20—⅝" tubes 16' long

ME MACHINERY AND EQUIPMENT CO.
123 Townsend St. · San Francisco 7, Calif.

CIRCLE 718 ON READER SERVICE CARD

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### ALUMINUM JACKETED KETTLES

From 180 gallons to fifty gallons

**Price 60 cents per gallon**

H. L. TRIESTRAM
Kalamazoo, Mich. 1603 Nazareth Road

CIRCLE 715 ON READER SERVICE CARD

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FOR SALE

### Hayssen Over Wrap

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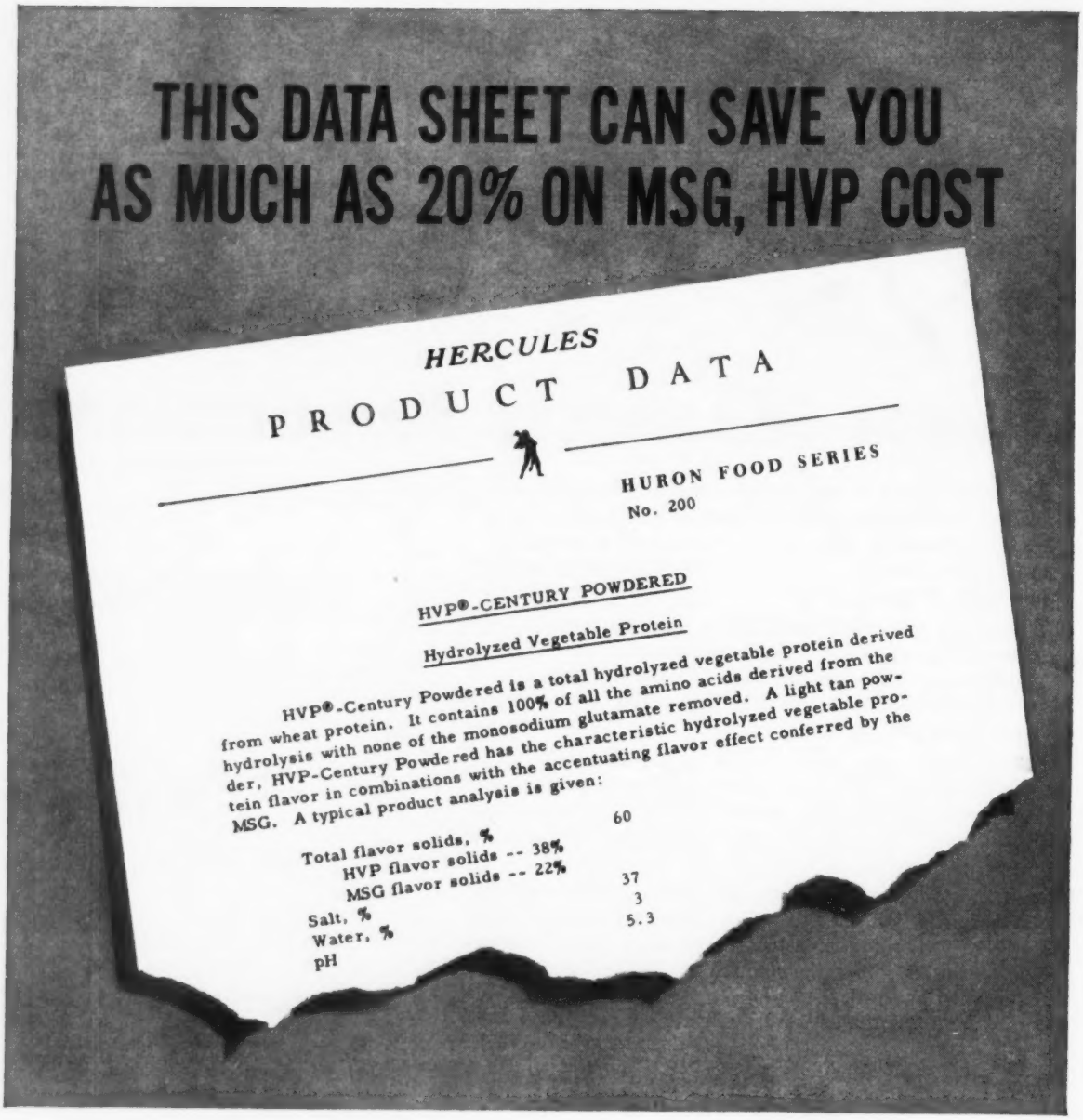

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|---|---|
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| MSG flavor solids -- 22% | |
| Salt, % | 37 |
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| pH | 5.3 |

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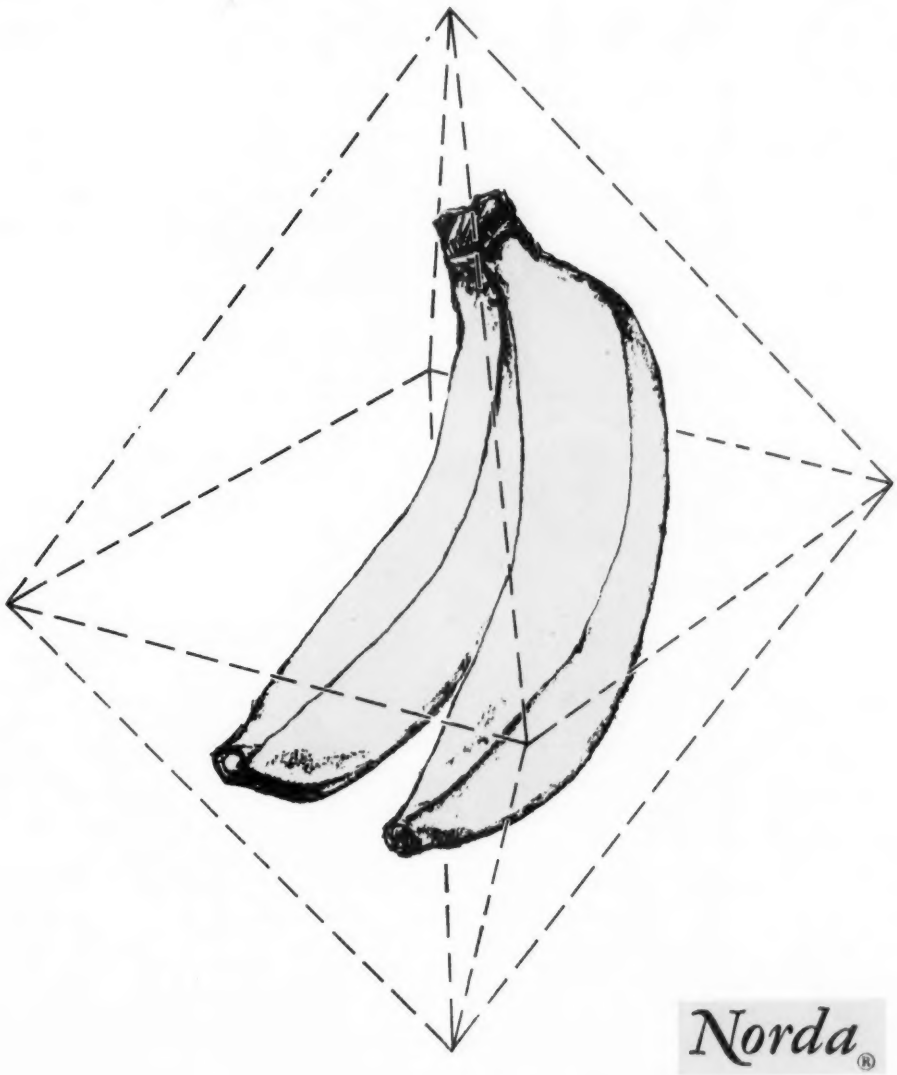

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